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40th ANNIVERSARY

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Volume 41, Number 7 **July 1961**

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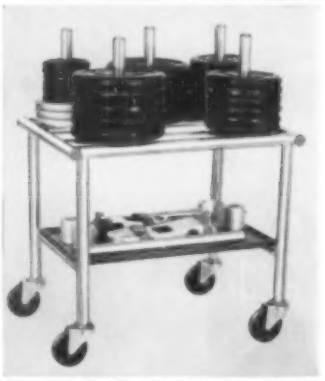

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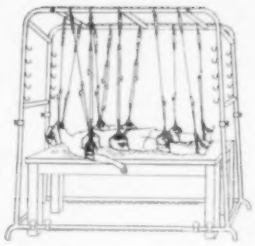

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Vol. 41 No. 7

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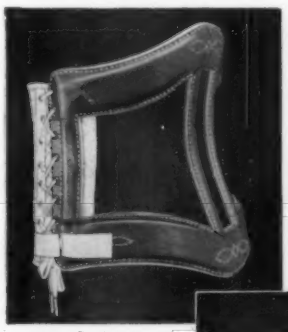

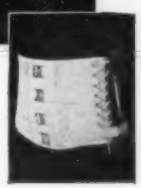

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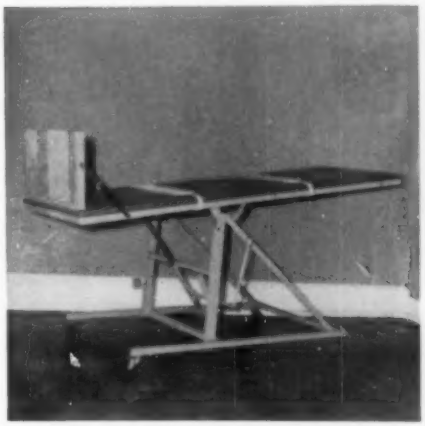

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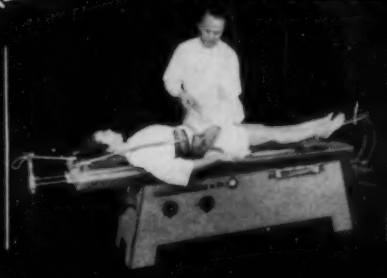

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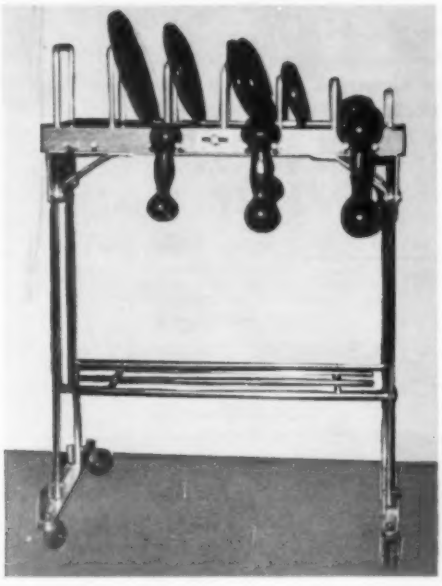

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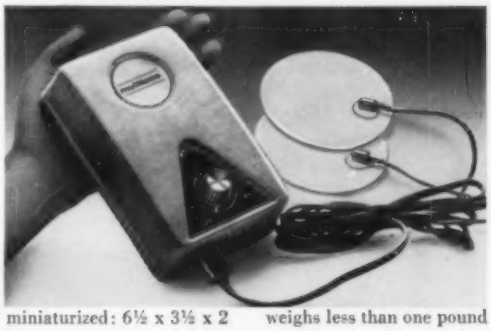

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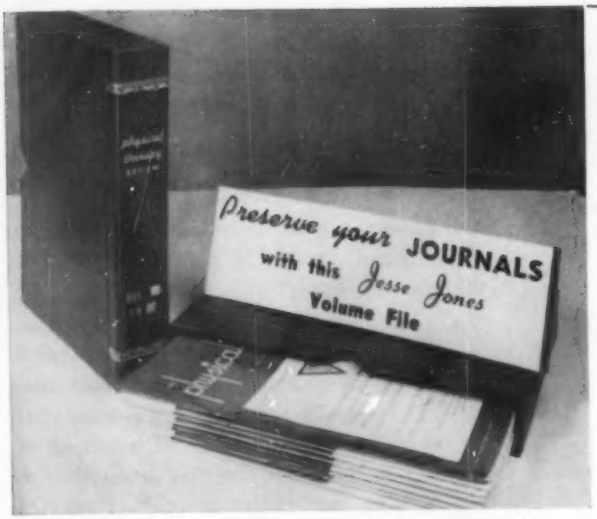

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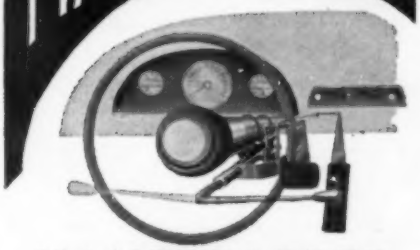

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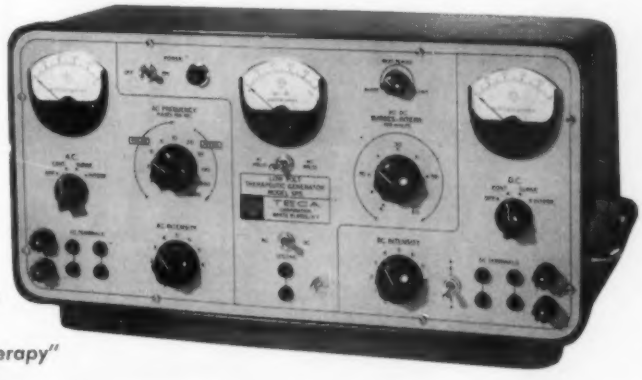

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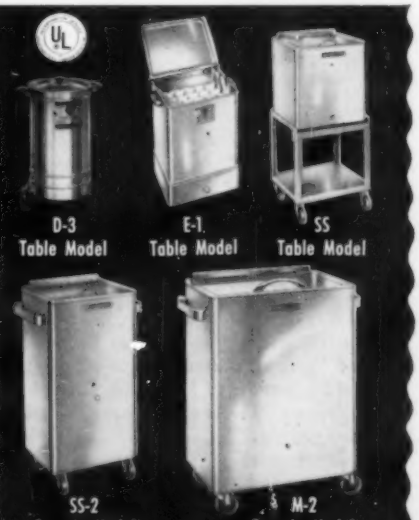

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Abstracts

Physical Therapy in the Treatment of Strains, Sprains, and Contusions in Industry*

Barbara P. La Chapelle, B.S.†

Although it seems incredible, it is true that many industries, particularly the automotive industries, have been spending millions of dollars in the past few years to increase the percentage of strains, sprains, and contusions in their factories. This has, of course, been a secondary rather than a primary result. With their intensive safety campaigns and research programs, they unquestionably have made great strides in the prevention of the major industrial accidents such as amputations, peripheral nerve injuries, and spinal cord injuries. But their new safety measures have, in turn, contributed to an increased production rate. Along with this, there has been an increase in what is referred to in industry as "microtrauma" or repetitive motion strain. Greater production has also increased the number of sprains and contusions resulting from the more rapid movements and greater co-ordination required by the workers operating machinery in the production lines.

These minor injuries constitute the majority of cases coming before compensation courts today. In fact, statistics prove that strains, sprains, and contusions now constitute at least 50 per cent of all industrial trauma, and from 90 per cent to 95 per cent of the injuries which result in time loss or job adjustment.

Industry all over the world has been emphasizing more and more the importance of physical rehabilitation. This rehabilitation should begin when an employee is first injured and should end only when that person has been restored to the highest possible functional level.

Thousands of dollars could be saved if patients were referred while still in the acute phase of their injury. The problem lies in the fact that few claims men and medical consultants for insurance companies believe that rehabilitation is indicated for minor injuries. However, in 1942 Liberty Mutual made a study of a number of its cases to determine what action could be taken to reduce costs. Two of the principal causes of long term disability were found to be errors in diagnosis and early treatment; and the change during convalescence into a pattern of a chronic disability.[1]

The so-called minor injuries may be classified under the three main categories: sprains, strains, and contusions.

Definitions

Sprain: A sprain is defined by Howorth[2] as an overstretching, or partial or complete laceration, of one or more ligaments with injury to the soft tissues and joint capsule as well. It is due to trauma in which a ligament is damaged by a force greater than it is able to resist. This occurs, for example, when the foot is inverted with the body weight upon it, tearing the ligaments attached to the lateral malleolus, or when the knee is forcibly abducted and externally rotated, tearing the medial collateral ligament. Shortly after the injury, a proliferation of fibroblasts and infiltration of lymphoid cells will be found near the bony attachment of the ligaments.

A sprain might be considered as the beginning of a dislocation. A more severe force in the same direction would often cause a dislocation or fracture. The aphorism that a sprain is sometimes worse than a fracture is based on the fact that the sprain may represent rupture of a ligament which may result in joint instability.

Strain: A strain is an overstretching or partial tearing of a few muscle fibrils. It is usually due to a sudden wrenching or twisting force.

Contusion: Wakefield[3] has defined a contusion as an injury from a blow without a laceration. It causes a spreading extravasation of blood into the tissues from an area crushed by

* Presented at the Annual Conference of The American Physical Therapy Association, June 1960.
† Director, Department of Physical Therapy Henry Ford Hospital, Detroit.

the blow. The skin may be injured by the direct impact. A blow or a fall may leave the skin intact but beneath it the tissues have been crushed sufficiently to tear the capillaries and smaller blood vessels. Blood escaping from these will spread and the area will become discolored.

It can be said then that a sprain is an injury to a joint; a strain, an injury to a muscle; and a contusion, an injury to soft tissues, a bone, or a joint.

SIGNS AND SYMPTOMS

The signs and symptoms in these types of injuries are usually the same but vary in degree. There is a sharp, localized tenderness at the site of the injury. Sprains can often be distinguished from fractures by the exact anatomic location of this tenderness. Along with this tenderness there is a local muscle spasm, ecchymosis, pain, edema, and limited range of motion. The key symptom is edema. If this can be controlled, the pain and limited range of motion will usually respond to treatment much more rapidly.

AIMS OF TREATMENT

The aims of physical therapy for the treatment of these injuries in industry are as follows: (1) to alleviate pain; (2) to reduce edema; (3) to maintain or restore joint range of motion; (4) to maintain or restore muscle strength; (5) to increase circulation in order to aid in healing; and (6) to return the worker to his job as rapidly as possible, without residuals.

TREATMENT

The program for strains, sprains, and contusions is directed toward treatment of the symptoms after the initial diagnostic roentgenogram is taken to rule out fractures and dislocations. In order to control the edema a pressure bandage is indicated immediately, followed by elevation and the application of ice. These have proved to be the most effective adjuncts in preventing or minimizing. Although strains usually require a minimum of treatment, sprains should be treated vigorously to avoid permanent disability.

The use of the pressure bandage should be continued for three or four days, or until the edema is at a minimum, and the patient should be reminded to keep the part elevated as much as possible.

Maximum benefit will be derived from the treatment of strains, sprains, and contusions, particularly in industry, if the use of physical therapy modalities is begun within twenty-four hours after the injury and is given twice a day. Very effective results are achieved by the use of whirlpool, contrast baths, ultrasound or a combination of these modalities, followed by active exercises.

Heat. Any type of heat may be used to precede exercise of the injured part, but certain considerations make some types more effective than others. Heating by conduction or surface heating may be accomplished by the use of hot packs, paraffin, or whirlpool. Heating by induction or heating of the muscles may be accomplished by the use of short wave or microwave diathermy. Ultrasound is frequently the treatment of choice for two reasons. First, because the heating occurs at the tissue interface, which is precisely where the sprain or strain occurs. It is also known to increase membrane permeability, which aids in reducing edema, and finally, it is a short treatment. Whereas it takes ninety minutes total time for three shortwave treatments, it takes only fifteen minutes total time for three ultrasound treatments. When this time difference is projected over a two week period, the time away from the patient's job is a very significant factor. For daily shortwave five days a week for two weeks, it would amount to a total of five hours as compared to approximately fifty minutes total treatment time with ultrasound.

In the treatment of a contusion, ultrasound may be started after twenty-four hours to diffuse the hemorrhage. In fact, during the application of the ultrasound one can actually see this happen. The dosage used in our department ranges from 1 to 1.5 w/cm.^{2} for five to ten minutes.

In injury, heat can alleviate pain and stiffness, but heat will not maintain or restore joint motion, prevent contractures, nor aid in developing muscle power. Heat therapy should serve as a prelude to treatment that will influence these conditions. Whatever the heat source, it must be supplemented by exercise.

Therapeutic Exercise. Active exercises are often prescribed for the entire extremity rather than the one joint involved. The reason for this being to prevent, for instance, the weak quadriceps which so often develops following an ankle sprain or the painful shoulder following a sprained or strained elbow.

One of the aims of therapeutic exercise is to encourage the repair of torn tissues without extensive adhesion formation or fascial contracture. Undue delay in the use of active exercises is the main element which encourages just such contractures. It is important to remember that passive movement, in an attempt to prevent subsequent stiffness, frequently aggravates the

condition, while active movement within the limits of pain will aid in a natural recovery.

If the injury involves the lower extremity, a brief period of gait training is indicated to prevent further strain of the injured joint or adjacent joints by an improper or limping gait.

In the more severe cases in which the use of a plaster cast is indicated for immobilization, it is preferable to have the cast bivalved so that progressive exercises may be begun twenty-four hours after the injury. This is particularly important in order to prevent the soft tissue adhesions which develop as a result of inactivity and contribute to circulatory and lymphatic stasis thus flooding the tissues with a serofibrinous fluid which acts as a glue. Similarly, joint adhesions develop rapidly from the exudation of this same serofibrinous fluid from a torn capsule.[4] It is for these reasons that the plaster cast for complete immobilization of a sprain or strain should be avoided and active exercise instituted very early in the treatment program. As soon as active exercise can be performed without pain, which is usually a matter of a couple of days, resistance may be applied manually. For the average sprain, the injured extremity will ordinarily be considered functional at the end of one week with a maximum of two weeks treatment required.

SITES OF INJURY

Ankle. Strains and sprains of the ankle usually involve the lateral ligament since the common mechanism of injury is inversion. Sprain of the ankle is probably the most frequent of all traumatic lesions of the extremities and its occurrence is not limited to any particular age group. The most common cause is that the patient turns the ankle while bearing weight upon it. This is frequently brought about by placing the foot upon an uneven surface when walking or running, or it may occur from a fall.

Key and Conwell[5] have reported that in the great majority of cases, the foot is turned inward on the leg and the injury is limited to the external lateral ligament of the ankle. The ligament consists of three fasciculi, and the anterior and middle fasciculi are torn to a variable degree, but the posterior fasciculus is rarely injured. The injured portion of the ligament may be completely torn, or it may be avulsed from its attachment to the malleolus or to the foot, or in less severe injuries there may be only a partial tearing or stretching of the ligament. In addition to the tearing of the ligament, there is an extravasation of the blood into the surrounding tissues, more or less effusion into the joint, and a variable amount of stretching of the peroneal muscles and soft tissues on the lateral surface of the ankle. Sprain of the lateral ligament of the ankle may mean a spontaneously reduced subluxation. A sprain of the distal tibiofibular joint may result in spreading of the ankle mortise.

In most cases complete fixation of a sprained ankle with a plaster cast is not the treatment of choice. It is to be remembered that the ligament is seldom completely ruptured, and repair of the soft tissues goes hand in hand with use or exercise. There is a large amount of exudate, and, with complete immobilization, the process of absorption is retarded and there is an increased formation of scar tissue along with an obvious delay in the recovery of function. On the other hand, if the ankle is protected with a pressure bandage, instead of a plaster cast, the injured ligament is still protected so that it is relaxed and the torn portions are held together; then the limited active motion possible will hasten the absorption of the exudate and markedly reduce the time of disability. With the pressure bandage and the aid of crutches, the patient should be encouraged to bear partial weight from the very beginning. This may be difficult for the first day or two, but if the attempt is conscientiously made, the pain rapidly diminishes in amount, and after that, progress is rapid.

Knee. Key and Conwell wrote that, despite the fact that the knee is one of the strongest joints in the body, injuries of the lateral ligaments are relatively frequent in young adult males engaged in strenuous sports, such as football, or in hazardous occupations such as mining. The injury to the ligament may occur from a direct cross strain on the partly flexed knee such as occurs in lifting or from a fall with the feet widely separated. The internal ligament is injured much more frequently than the external. Actually, the joint is moved medially or laterally beyond its physiological limits in a knee sprain, with consequent overstretching of its component parts.

The lateral ligaments of the knee are thickened portions of the joint capsule. An injury to the ligament is accompanied by capsular and synovial damage, and it is nearly always followed by effusion into the joint. The ligament and adjacent portions of the capsule may be torn across or merely stretched with diffuse tearing of the fibers. The semilunar cartilages are frequently injured in these sprains of the knee because they are intimately bound to the lateral ligaments.

Treatment usually consists of a bivalved cast, whirlpool, ultrasound, and active exercise. The exercise should progress from quadriceps setting during the period of immobilization to progressive resistance exercises always being very careful to prevent lateral movement of the knee joint during exercise. Muscle exercise during the period of immobilization is important not only to maintain the circulation and to prevent venous stasis and adhesion formation but also to preserve muscle control of the joint. This is of particular importance in the weight-bearing joints.

The fact that weakness of the quadriceps muscle has been demonstrated after only thirteen hours of immobilization of the knee joint emphasizes its importance in relation to disability and rehabilitation. The rapid loss of tone, strength, and voluntary control of the quadriceps group, which is commonly observed, is out of proportion to muscle weakness observed in other portions of the body and is unexplained. Weakness of this structure leads to a vicious cycle of pathologic changes. Following injury and subsequent effusion, a reflex activity inhibits the quadriceps and produces quadriceps atrophy. The active protection of the muscles is lost with weight bearing, thereby subjecting the passive stabilizing elements of the joint to trauma and stretching, as it is imperfectly guarded from the ordinary twists and strains of walking on rough, irregular surfaces. This irritation increases the effusion; the effusion demands further immobilization and inactivity, which in turn produces further atrophy of the muscles, and another round through the vicious cycle. A reversal of this process can be anticipated only when the muscular action, tone, and coordination are returned to normal by weight-resisting exercises without weightbearing. This is a logical explanation of the emphasis placed on quadriceps exercises in the rehabilitation following injuries to the knee, and is why we prefer the use of a bivalved cast and active exercise on the first day after injury. Some manual resistance to knee extension may be instituted on the second day in the average case. Crutches are usually necessary for the first three or four days following a sprained knee or ankle.

Arthritis is a very common complication of a strain or sprain. An elderly patient with creaking joints twists one knee which results in a strain. The muscle wastes. The joint is unguarded. From then onwards there is pain, swelling, weakness and "giving way." The knee joint has been arthritic for years, but never before has it accounted for symptoms. The opposite knee is equally arthritic, but it is painless. We feel the most important treatment is quadriceps exercise to restore strength to the wasted muscle, and within a few months the knee is again free from symptoms.

The importance of quadriceps exercise cannot be overemphasized, whether the injury is to the ankle, knee, or hip. The patient must be taught to contract the muscle himself. Even this is not enough, for he imagines that a few minutes of exercise each day is sufficient. He must be specifically instructed to exercise every hour of the day for five minutes.

Wrist. The most frequently sprained joint in the upper extremity is the wrist. After a compression, hyperextension, flexion, or torsion injury, the patient has severe pain which is generally distributed throughout the wrist; there may be complete inability to use the hand and there may be moderate swelling which involves the entire carpal region. Frequently, there is tenderness around the entire joint. At other times the tenderness tends to be localized over the dorsal or flexor surface or over one of the lateral ligaments. Pain can usually be relieved by immobilization in the acute stage. Prognosis is good and most of these cases are practically normal at the end of three or four weeks with a period of temporary disability lasting for about seven days.

Elbow and Finger. Moderately severe elbow and finger sprains frequently result in a permanent limitation of motion. The elbow is very susceptible to injury. The joint capsule, the lateral ligaments and the orbicular ligament all may suffer injury in an elbow sprain. Even minor strains which are often repeated cause serofibrinous exudation, adhesion formation and capsular contraction. Movement must be allowed to recover at its own rate. If any attempt is made to accelerate recovery by forcible measures, permanent stiffness is the inevitable penalty. Injury to the phalangeal joints is frequently followed by swelling of the periarticular structures with a marked limitation of motion.

Severe contusion of the finger warrants a special description because the pulp of the finger lies in a closed connective tissure sac which is waterproof and which, if not ruptured at the time may become distended with blood under pressure to such an extent that necrosis of the bone may occur. As a rule it is necessary in these severe cases to puncture the nail over the hematoma or to make an incision into the side of the finger tip.

Shoulder. Sprains of the shoulder joint, which are usually due to wrenching of the shoulder, cause little disability with proper treatment and early mobilization. The coracoacromial ligament is most affected in these injuries. With proper treatment, the temporary disability should not last more than three to four weeks. Again the question of long immobilization enters into the prognosis, especially in patients past forty years of age. Prolonged immobilization may cause permanent disability as evidenced by atrophy, muscular weakness and restriction of the shoulder joint motion.

Strains, sprains, and contusions of the cervical and lumbar areas is a large and involved subject which will be discussed briefly in this paper.

Cervical. Many patients come to the physician with the complaint of pain in the neck with or without spasm, with variable radiation of pain, with gradations from those of trivial annoyance to those exhibiting intractable causalgia. The question of injury, whether recent or remote, is frequently slurred over by the patient for the reason that painful symptoms may not develop for weeks, months, or even years after the injury occurs. A careful evaluation of the history may bring to light a definite injury, one or several days before, or months or even years prior to the onset of disabling symptoms. The matter of a specific diagnosis is as much a matter of pain to the physician confronted with such a complaint as it is a matter of pain to the patient. The patient interprets the original fleeting symptoms as a sprain either not worthy of medical attention or as something merely requiring liniments, massage, manipulation or drugs. In this connection the word "sprain" is unfortunate since it implies something of very small degree. It should indicate to the physician a torn muscle, fascia, ligament, or joint capsule.

Treatment for cervical strains and sprains is the same as that for the extremities—heat followed by exercise. In addition though, traction is invariably added to the regime. Of the many types of cervical traction—prone, supine, sitting, static, intermittent, mechanical, or manual, we believe that the best results are obtained by intermittent traction with the patient sitting and using traction varying from five to twenty-five pounds and having the patient actively rotate his head to loosen and stretch the cervical musculature.

Lumbar. In the lumbosacral region there is a complex anatomical system of more than twenty joints with innumerable ligaments, muscles and aponeuroses. These joints are as susceptible to trauma as the joints of the limbs; they may suffer ligamentous injury, muscle strain, cartilage displacement, subluxation, dislocation, or traumatic arthritis. While the knee joint, for example, is a single and easily accessible joint, the lumbosacral system of joints is not, and the various components cannot be examined individually. Difficulties also arise from the closely related nerve trunks and fibers. Just as in the cervical region the responsible injury may immediately precede the onset of symptoms, or there may be an interval of some months. The accident is sometimes a fall from a height in the standing or sitting position, or a flexion force great enough to produce a fracture of a vertebral body. More often it is a strain sustained by lifting heavy weight. The lumbar region of man has been modified to meet the requirements of the erect posture, and its structural efficiency is greatest in that position. In the stooping position the muscles and ligaments are on a stretch, and the joints bear a cross strain. This susceptibility to injury is often increased by the architectural deficiencies which are so common at the lumbosacral junction.

In the occupational type of low back strain it is usually possible in the history to connect the symptoms with some movement or position assumed while at work, and there is usually a history to the effect that this type of work results in exacerbation of the symptoms.

In traumatic low back strain the patient can usually ascribe the onset to a definite injury or movement. It may be merely stooping over to tie the shoe, but at the time of the accident the patient feels a sharp pain or has a sensation of something giving way in the low back. In some cases there is immediate disability, the pain is very severe and persists; in others the patient is able to continue with his work and the pain comes on gradually, getting worse within a few hours or days. The patient may work for several days with the pain until he is forced to stop by pain, weakness, and stiffness in the low back. Pain and disability vary. One patient may merely complain of slight pain in the low back from time to time with certain movements; another may be completely disabled with severe pain, and once he is able to assume a position of comfort, he objects very much to being moved.

A sprain of the back may be expected to heal as quickly as sprained ligaments of other joints, but a residual soreness due to fibrous hyperplasia and often adhesions or scar tissue may prevent work for several weeks after the primary healing has taken place. There may also be a

period of superimposed disease, such as arthritis, herniated nucleus pulposus, or malingering. In all back sprains roentgenograms are negative.

In accident and industrial cases we have the problem of determining whether or not the patient's symptoms are faked or exaggerated, and if the patient has symptoms, whether or not they are due to postural defects, to trauma, or to arthritis. If arthritis is present, it may have been caused by the strain, or a pre-existing painless arthritis may have been aggravated by the trauma to such an extent that it now causes pain and disability.

Results show that the longer treatment is delayed, the smaller is the probability of improvement regardless of whether the patient expects compensation or not. Generally, the patients who receive compensation are referred for treatment later than those who do not. The reasons for this will be discussed later. The more severely injured patients are eventually hospitalized for an intensive treatment program, but one gets the impression that many of these patients receive inadequate therapy for a prolonged period of time. Even when an attempt is made to give physical therapy, this frequently consists of the application of heat from a heat lamp or a diathermy machine alone. This is certainly not adequate, but the patient considers it to be physical therapy. When he is finally referred for more intensive treatment, he has developed a prejudice against physical therapy which must be overcome. From this standpoint, it would often be preferable if this patient received no treatment rather than inadequate therapy; and the latter certainly should not be continued over prolonged periods of time. Otherwise, many patients become resentful toward their employers and/or their doctors, and lose their motivation to return to work. If a doctor is treating a patient without being able to provide an intensive treatment program, there appears to be a danger point at about one month, after which results of treatment fall off sharply for patients in the compensation group.

Although results are worse for patients who are referred for treatment after three months or more, it is usually still advisable to give them a trial of adequate treatment since it has been shown that over a third of them can be improved sufficiently to return to work. Of course if the same treatment could be provided within the first week after injury, almost twice as many would recover. Early treatment is especially important if the patient is receiving compensation.

Patients who suffer acute back strain and receive compensation present different psychological problems than the group which does not receive compensation. Yet some patients in the former group respond well to conservative management and return to their jobs after a minimum number of treatments. The difference appears to lie within the basic personality structure of the injured individual.

The general approach to the patient is important and should develop the attitude that the back disability is only temporary.

OTHER ASPECTS OF TREATMENT

In treating the majority of these types of injuries, an assurance of prompt and complete recovery is of utmost importance. Even with minor injuries this assurance should be given. Otherwise, seeds of doubt and fear may be sown which can only be eradicated with difficulty at a later stage.

The keystone of all rehabilitative programs is the motivation of the patient—how a patient feels and reacts to a disabling injury.

A doctor needs keen insight into the motivational factors operating in the workman in order to identify and understand the one who belittles his injury in order to return to work and the other who claims trauma which is inconsistent with clinical findings.

In an article on industrial aspects of rehabilitation, J. F. McCahan, M.D.,[7] gave forceful expression of this fact: "Of vital importance in any rehabilitation effort is the attitude of the patient. His morale, his will to achieve can be the catalyst or stone wall. He will accomplish what he feels he can accomplish and no more. Attention to his mental needs is the vital initial approach regardless of the nature of the rehabilitation problem. Some call it motivation, others call it guts. But whatever name, it is still the single most important factor."

The patient's attitude towards his disability may be out of all proportion to the degree of the actual injury, or handicap. Karl Meninger stated that, "The disability is not so much what the examiner perceives, but what the patient perceives it to be." The statement that complaint and situation are often quite different is true in rehabilitation. The physical therapist must be prepared to look upon the patient as a constantly changing individual in a stress situation in which everything relating to his mental and emotional health now becomes more highly complex and individualized.

Many complex factors must be taken into account in an effort to understand what the disability means to the patient. The mental, neurological, and physical aspects may be associated in relation to the nature, degree, severity, and extent of the disability. Disabilities may be congenital or acquired, temporary or prolonged, and stationary or progressive. They certainly tend to become chronic if rehabilitation techniques are not used early. Indifference and resistance to rehabilitation occur if the patient is allowed to slip into chronic disability. As in all diseases, early treatment is of the utmost importance. The patient's drive for self-esteem, his creativeness, and his identification with family figures are all intertwined with his emotional reaction to disability. The individual's work habits and his acceptance of work as a fulfillment rather than a burden constitute an integral part of his response to rehabilitative efforts.

We certainly cannot overlook a tremendous stumbling block, disability insurance, in the success of any industrial rehabilitation program. The manner in which these plans are set up works in direct opposition to the rapid rehabilitation of an employee. Since he must prove disability he tends to believe it himself, aided oftentimes by his lawyer. The aim is to establish disability, not to achieve recovery. The necessity of insisting upon pain and limitation of function to establish disability presents a tremendous deterrent to rehabilitation in many cases. A revision in disability insurance plans should be made so that the major emphasis is recovery, not establishment of the right to a cash settlement.

The process of rehabilitation provides opportunities for an intimate knowledge of the worker's condition as it can be ascertained in the composite by the rehabilitation personnel working with the individual. These people, by their professional training and composite disciplines, are best able to evaluate the disability and offer an adequate prognosis, not in old legalistic categorical terms, but realistically, practically, and much more competently than ever before. This enables one to determine the extent of a disability far more accurately and thus would make the allotting of disability insurance more feasible.

In Ontario[6] much progress has been made in this direction. Their objective in every case has been stated in their compensation philosophy as follows: to assist the injured workman to return to his job as quickly as possible with minimum impairment. They describe their system by stating that rehabilitation in the broadest meaning of the term is an indivisible and integral part of the entire compensation system. We, like other observers, have been unimpressed by the results of attempts to graft a rehabilitation program onto a purely forensic system which inhibits the rehabilitee from accepting such service until court settlement is completed. If rehabilitation is viewed merely as a salvage service, it immediately loses a great deal of its effectiveness.

SUMMARY

Proper diagnosis, early and adequate treatment, adequate equipment and competent personnel are of major importance in the treatment of strains, sprains, and contusions. With these available an early return to the fullest possible function should be easily attained and compensation payments should be greatly reduced.

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The hardest conviction to get into the mind of a beginner is that the education upon which he is engaged is not a college course, not a medical course, but a life course, for which the work of a few years under teachers is but a preparation.—OSLER

Industrial Incidence of Soft Tissue Syndromes*

Margaret J. Wells, B.S.†

A syndrome is a group of signs and symptoms that occur together and characterize a disease. Therefore, "soft tissue syndrome" refers to those diseases which affect the soft tissues. The main diseases in this category are tendinitis, tenasynovitis, bursitis, myositis, myofascitis, and fibrositis. Two or three of these conditions are most prevalent in industry, at least in this plant and in some of the other light industry in and around the Milwaukee area. Of the 100 industrial cases reviewed before preparing this material, 50 per cent fell under the diagnosis of sprains, strains, and contusions. Twenty-two per cent were forms of tendinitis; 7 per cent were bursitis; 8 per cent were ganglions; 1 per cent myositis; and the remaining 12 per cent included burns, fractures, lacerations, dermatitis, infections, and dislocations. After sprains, strains and contusions are eliminated, tendinitis cases rank next.

Tendinitis

Tendinitis is an inflammation of tendons[1] and of tendon-muscle attachments. The etiology is now unknown. The history of tendinitis in industry, at least in the Milwaukee area, goes back to the era of World War II. During the war years there were great pleas made for people to volunteer to work in the factories. Housewives were recruited from motion picture audiences. They were marched in spectacular parades to the various industries. At one small industry about 3,000 new employees were recruited to help manufacture insulators for walkie-talkies. These women sat all day long at little lathes doing piecework which involved rapid, repetitive motion. After one or two weeks of this kind of work five out of every 100 employees developed tendinitis. What was the difference between these five persons and the other ninety-five? The difference is something over which we have no control. Human bodies are not capable of lubrication as we have no grease cups to be refilled or oil pumps that can be replaced.

Industry's main problem with the "motion injury" is how to control it as there will be jobs requiring repetitive motion. This is true in light industry more than in heavy industry. Heavy industry has more mechanical devices because of the large machinery used, and parts that are manufactured. Even with automation there exists the need for fine motions which can cause tendinitis. To help eliminate this problem new employees in most companies have a probationary period. At this company it is ninety days. Usually in this period of time the employees who are most susceptible to this type of injury can be detected and transferred. When the new employee is interviewed, it is very important to discuss other jobs he has held, so that it can be determined whether or not he is prone to this type of motion injury.

After a person is employed and on the job he must be urged to report the very first symptoms he has, no matter how minor they are. The foreman and supervisors must be made aware of the conditions that can arise from continuous repetitive motion so that when an employee makes a complaint he is sent to the doctor immediately, and is not classified as a chronic complainer.

The treatment will vary with the severity of the case. Acute cases are treated with steroids, which are administered orally, or if no relief is attained, by injection and by immobilization of the affected part. With hand and wrist involvement, and if the patient demonstrates objective symptoms, such as crepitus, a cock-up splint is applied with the hand in a position of use. This splint is left on for one week and the patient is taken off his job. After one week the splint is removed and the patient goes back to work for a week but not on a repetitive motion job. The patient is then examined again and if there has been no return of sympoms he may return to his own job. If after returning to his job there is a return of objective symptoms, the splint is reapplied and the patient repeats the same routine. If necessary, this cycle is repeated three times. If there is no improvement, the employee should be taken off the job.

The problem is not too difficult to solve in the new employee who is in his probationary period. Either he can be released or transferred to a different job or job classification. The employees who develop motion injuries after they have been doing the same job for five or ten years are the ones who present major difficulties. It is very hard for the employee to under-

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stand why, after all these years of having no trouble, he has pains in his wrist, elbow, or shoulder from the work that he is doing. If he must be transferred to another job, the situation can be very difficult for both the employee and the employer. With five or ten years of seniority the employee will have his union's support to help him obtain a job with comparable pay. The employee might have been earning $3.25 an hour as a drill press operator so he is not interested in a job as a floor sweeper for only $2.50 an hour since this is a great threat to his economic security. This is one of management's greatest problems involving motion injuries. The best known solution is rotation of employees to and from jobs which are known to produce this type of injury. There are several plans for rotation which can be used. The employee may change jobs every week, rotate jobs every day, or be on the job two hours and off the job two hours.

As previously stated, in the acute phase, steroids and immobilization are prescribed by the physician. In chronic and long term cases, the physicians will order physical therapy in the form of shortwave or microwave diathermy or whirlpool. Of the twenty-two cases reviewed, five required a job change, five received therapy, and the remainder were treated with steroids and immobilization only. Two case histories, one of acute tendinitis from repetitive motion, and the other a traumatic tendinitis aggravated by repetitive motion will illustrate the care of these patients.

Case I. On April 18, 1960 a thirty-six year old male reported to the medical department complaining of pains in his wrist and forearm. He operates a turret lathe machine which requires him to make a rotating movement with his right wrist almost continuously. He was given an appointment to see the company physician. On April 19, 1960 he was examined by the physician. The objective findings were pain in the right wrist on abduction, adduction, and hyperextension. The physician made a diagnosis of acute tendinitis of the right wrist. He then injected the wrist with hydrocortone, one of the steroids. For one week the patient was put on another job which did not require continuous repetitive wrist motion. After one week he returned to his own job. On May 10, 1960 he was again seen by the physician. At this time all motions were in normal range and painless. The physician then cautioned him on care in use of his hand and then discharged him. Up to the present time there has been no recurrence of the difficulty.

Case II. On March 15, 1960 a thirty-three year old male reported to the medical department with a history of pain in his right wrist for one week. The patient related that on March 8, 1960 he was pressing very hard on his machine in order to move the head of it. Following this pressure he developed pain in his right wrist. At first he thought it was just a transient strain. A week later the pain was more severe so he reported it to the medical department and an appointment was made with the company physician. He was seen by the physician on March 15, 1960 at which time he had pain on hyperextension of the right wrist or on grasping firmly with the right hand. There was tenderness in the region of the right navicular bone. X-rays were taken and they were negative for a fracture. The patient was given an oral steroid, two tablets, four times a day and told to return in one week. On March 22, 1960 the patient was again seen by the physician. The pain was about the same and the treatment was a continuation of the medication. At this time the physician made a diagnosis of traumatic tendinitis. On April 5, 1960 he again saw the physician at which time the pain had become considerably worse. There was marked tenderness at the point of the proximal end of the first metacarpal at the tendon insertion. At this visit the physician injected the wrist with hydrocortisone. The patient's next visit was on April 15, 1960. Up until April 14 the wrist had been much improved. On April 14th he played ping pong which left him with marked tenderness along extensor tendons of the right thumb at the wrist. The physician injected his wrist with hydrocortisone and put it in a hand and forearm splint. Having this done involved a temporary job change. He was again seen by the physician on April 26 at which time his wrist had improved up until the time he had thrown a softball which was followed by a recurrence of the pain. The physician ordered daily whirlpool treatments. The patient received whirlpool daily for two weeks. On May 17, 1960 he was again seen by the physician. He stated that his wrist felt good. The physician told him it might ache at times and that the disease could easily recur. He cautioned the patient on the care in the use of his arm. After the ping pong and softball episode the patient was finally convinced his activity of continuous motion was causing the aggravation. He was discharged by the physician at the time of this visit. Up to the present time there has been no recurrence of difficulty and he has been more careful in the use of his hands.

GANGLIONS

The second greatest offender occurring from repetitive motion is the ganglion which by definition is a small hard tumor, connected with either joint or tendon sheath.[1] As yet there is no agreement as to the etiology of the ganglion. Surgery for ganglions has yielded disappointing results. A certain degree of risk is involved in surgery on a joint and ganglions may also recur following surgery. This is no reflection on the surgeon. In the past three years they have started injecting ganglions with hydrocortisone and other steroids with excellent results. It seems that by no means does injection preclude the need for surgery. Injections have relieved the symptoms and there are no harmful side affects. Of the eight cases reviewed, seven were injected and one had a pressure pad applied. There has been no recurrence of the symptoms in any of the eight cases.

BURSITIS

The third highest offender was bursitis which by definition is the inflammation of a bursa.[1] The bursae are small sacs lined with synovial membrane. They are situated in the neighborhood of joints where tendons press upon bones or the joint capsule. Certain bursae are constant and others are present only when there is prolonged irritation. There are perhaps a thousand bursae in the body, and they act between the moving parts as a lubricating buffer. The synovial membrane of the bursal sac may become inflamed from overuse. This will cause pain upon any motion which causes the surfaces to rub together.[2]

The three most commonly irritated bursae found in our industrial cases are subdeltoid, raidohumeral, and trochanteric. In all three instances bursitis can result from repetitive motion. The subdeltoid bursitis occurs in workers using machines which involve a great deal of shoulder motion; radiohumeral bursitis is produced by jobs which require rapid repetitive motions involving pronation and supination of the forearm; and trochanteric bursitis is caused by work with machines operated mostly by foot pedals Trochanteric bursitis is least commonly seen.

Subdeltoid bursitis is inflammation of the bursa that facilitates the movement of the head of the humerus beneath the deltoid muscle.[2] In the acute stage there is no therapy in the form of heat or exercise. Most physicians use steroids. Treatment by injection is often done by the orthopedic surgeon. Steroids taken by mouth are just as effective in most cases and much easier to administer. When the acute stage is past and after one week of steroid therapy, the patient will gradually begin with Codman's exercise and then will continue on a program of heat and exercise. When patients in this firm have recurring attacks without the acute stage we immediately begin a program of heat and exercise. The type of heat used will vary with each patient's tolerance. Ninety per cent of these patients can tolerate diathermy and the other 10 per cent receive more relief from hot packs or infrared. The exercise program is also geared to the patient's tolerance and is most important from the standpoint of preventing the "frozen shoulder." There is more recurrence of subdeltoid bursitis than either radiohumeral or trochanteric bursitis among our employees.

Radiohumeral bursitis is also referred to as epicondylitis humeri, tennis elbow, epicondylitis, epondylalgia, and golf elbow.[2] This condition is very common in industry among employees who have jobs involving rapid, repetitive supination and pronation of the forearm. This type of activity can bring about the inflammation of the bursa at the radiohumeral articulation. This bursitic condition, with the exception of a few very severe cases, also responds favorably to steriods. The selection of the route of administration of steroids depends on whether the tenderness can be pinpointed or is diffuse. When tenderness can be definitely pinpointed, the good results are obtained with injections. If the tenderness is diffuse relief can be obtained from the oral steroids and with less pain. Following injections the relief is often dramatic. The injection itself is very painful but within twenty-four hours the pain and tenderness have disappeared. With the more severe cases that do not respond to steroid therapy the patients will very often get symptomatic relief of pain from heat. Microwave is the preferred type of heat prescribed by our company physicians. Surgery may be performed for the most severe cases but this is done only after everything else has failed. After excision of the bursa, the patient is left with a weak arm and a permanent disability.

The least common type of bursitis seen in our industry is the inflammation of the bursa that lies between the great trochanter of the femur and the overlying muscle. When this bursa becomes inflamed, pain occurs on external rotation of the thigh. The majority of cases responded favorably to any therapy which induces a local hyperemia.[2] Again as in treatment of subdeltoid bursitis, the type of heat used depends on what

type the patient can tolerate best. The heat is then generally followed by a mild form of exercise.

In general, in the treatment of these patients, physical therapy has no place in the acute stage which calls for rest, immobilization, steroid therapy, and the use of sedatives. When the conditions become chronic, which often happens in these injuries, physical therapy plays a major role in providing heat and exercise to the affected part. With the aid of physical therapy employees with these chronic conditions are able to continue working and, therefore, have a greater feeling of economic security.

THE INDUSTRIAL MEDICAL DEPARTMENT

The medical department at Allen-Bradley had progressed from a service with one nurse to nursing service twenty-four hours a day by 1942. A medical director was employed in 1945. A completely new diagnostic clinic was built in 1951 expanding from ten rooms to some thirty rooms. Gradually, a full technical staff was added. There is a staff of eighteen people at present. In March 1958 the most recent addition to the medical department was completed making a total of approximately fifty-four rooms. In 1941 our plant population was roughly 900 and in 1960 it was close to 6,500. Along with the increase in number of employees, the daily patient load has developed from 400 calls per year to over 113,000 annually.

In our medical department the patient load and work entailed for the cases that are the result of occupational injury or illness is comparatively very small. Of the 113,000 calls to the medical department, between 4,000 and 5,000 were directly the result of occupational injury or illness. This means that approximately 98,000 patient calls were unrelated to the employees' work.

Physical Therapy. In the physical therapy department at the present time fifty-nine patients are being treated. Only seventeen are ill as the result of their occupation. At Allen-Bradley the belief is that the good health of the employees is a prime asset. If an employee is in need of physical therapy, whether from industrial origin or not, and if he has to go outside the plant to receive this treatment, he is wasting valuable time. Whether a worker is on the assembly line or is one of the key persons in management, the investment in the physical therapy department is well worthwhile. In this way an employee will miss only one-half hour or forty-five minutes for a treatment compared to the loss of one-half day in going to an outpatient clinic for treatment. The department is equipped with whirlpool tanks, a Hubbard tank, three diathermy machines, one microwave machine, hydrocollator packs, an infrared lamp, a paraffin bath, ultraviolet lamps, and an exercise area. The daily average of treatments varies between sixty-six and ninety.

To keep the men and women on the job was perhaps the original stimulus for the inception of the present medical department. This led to our present day thinking about the importance of occupational health. It certainly was the beginning of the realization that our greatest investment was centered in our employees and that anything we can do to safeguard the invaluable asset of good health and to insure the investment was, and is, worthwhile.[3] Our employee turnover is less than one-fourth of 1 per cent and we like to think that our medical department is in some way responsible for helping to maintain this low rate of turnover.

Acknowledgment. The author would like to take this opportunity to thank the following people for their contributions: Dr. Fred C. Heidner, Chief of Industrial Surgery of Deaconess Hospital, Milwaukee; Dr. C. A. Bauer, Industrial Surgeon for the Allen-Bradley Company; and Myrian J. Braun, R.N., Director of Industrial Nursing Services, Allen-Bradley Company.

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Whatever this tool (scientific method) in the hand of man will produce depends entirely on the nature of goals alive in this mankind. Once these goals exist, the scientific method furnishes means to realize them. Yet it cannot furnish the very goals. The scientific method itself would not have led anywhere, it would not even have been born without a passionate striving for clear understanding.—ALBERT EINSTEIN, *Out of My Later Years*, p. 113, New York, Philosophical Library, 1950.

The Adjustable Knee Splint

Capt. Carl V. Granger, Jr., MC*

Temporary bracing is an important adjunct in the physical rehabilitation of patients in whom a paretic disorder has rendered one or both knees unstable. Generally, permanent braces are prescribed when the neurologic condition has stabilized or long-term need is evident. However, there are many patients in whom the neurologic picture is changing, long-term need is uncertain, or the feasibility of ambulation is questionable. For these, permanent bracing is delayed or withheld. Patients in the early convalescent period of hemiplegia, spinal cord injury, polyneuritis, and poliomyelitis are in this category. The feasibility of ambulation may be questionable in a patient with a high cord lesion, long-standing hemiplegia (non-ambulatory), or poor motivation. Permanent braces may be withheld in the case of malignancy involving the spinal cord because of the prognosis. Yet, standing and ambulation are important factors in sustaining morale.

Temporary bracing offers many advantages while meeting the immediate need of a large number of patients. Ambulation training is begun at the time indicated rather than delayed until permanent braces are fitted. Evaluation during a trial with temporary braces facilitates the prescription of permanent braces. Finally, time and effort are saved, excessive expense is avoided, and the over-all period of training is shortened.

Knee Splints

Knee splints[1] are commonly used for temporary support of paretic knees. Some disadvantages include excessive pressure on the calf and posterior thigh while holding the knee in extension. Frequently, bulky padding is required for thin individuals. Particularly undesirable is the fact that the thigh band strikes the patient low, permiting him to "sit" on the apparatus with knees and hips slightly flexed. If allowed to train in this posture, the patient fails to develop proper balance.

A multipurpose brace,[2] the Keystone Splint[3] and the Handy-Standie Splint[4] have been described for use in temporary bracing. The adjustable knee splint is offered as a preferred form of temporary bracing.

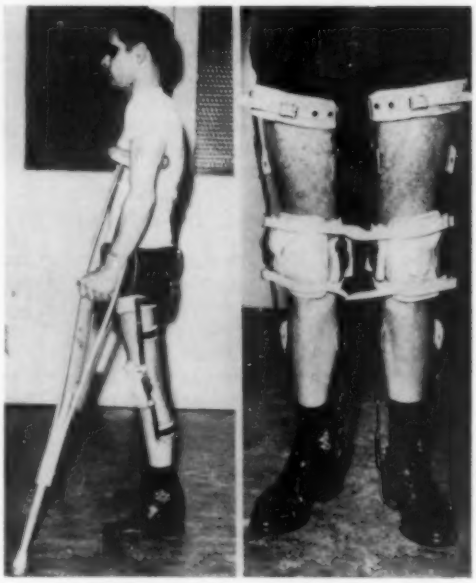

FIG. 1. The adjustable knee splint on a patient with poliomyelitis. High placement of the thigh band precludes "sitting" on the splints with hips flexed. In spite of the discrepancy in fit between upper splint and atrophic thigh, stability is adequate for training purposes. A felt pad between the knee and medial hinge is necessary because of knee valgus.

Adjustable Knee Splint

The adjustable knee splint being used in Figure 1 is sturdy and contoured. It utilizes one point of pressure at the knee and two points of counterpressure, one at the upper thigh and the other at the heel (through the shoe). By means of stable heel contact, plus high thigh contact it is designed to overcome the disadvantages previously described. Provision is also made for control of foot drop. The splint has a medial extension bar to the shoe and resembles the Campbell long-leg brace.

The three sections are separable. The thigh section is adjustable on the knee section to match thigh length. There are drop locks at the knee

* Department of Physical Medicine, Letterman General Hospital, San Francisco, California.
[2] Pope Foundation, Inc., Kankakee, Illinois.

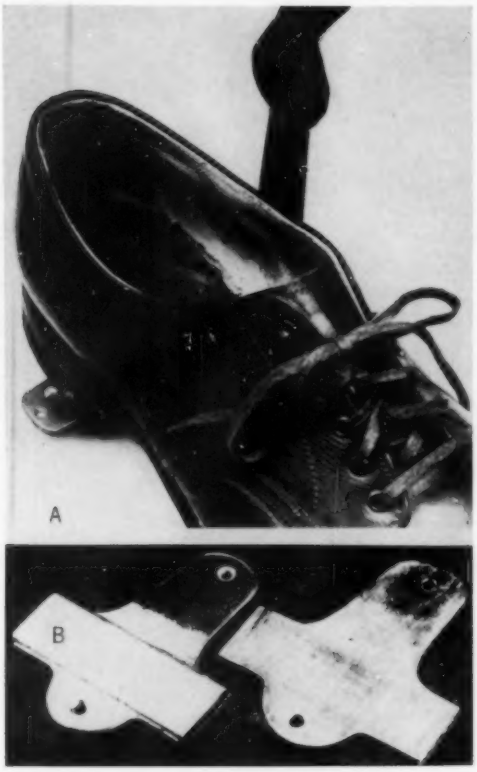

FIG. 2. A, Drill holes in the lateral end of the heel insert receive a cotter pin to prevent the shoe from slipping off, and B, The caliper stirrup foot-plate (under surface of the foot-plate on the left, and top surface of the right foot-plate on the right).

hinge. The calf band maintains the separation of the uprights, and therefore should be deep enough that it never presses into the calf. The medial shoe bar is made in two lengths to facilitate fitting tall and short patients and is adjustable on the knee section to match leg length. It is always secured with two screws. Either a Klenzak spring ankle hinge or a 90° plantar flexion stop is incorporated into the medial shoe bar at the level of the anatomic joint. The lateral end of the heel insert has drill holes to receive a cotter pin to prevent the shoe from slipping off (Fig. 2A). All adjustment screws should be interchangeable.

The patient in Figure 1 has paraplegia due to poliomyelitis. Because of valgus at the knee and pressure against the medial hinge, a felt pad is inserted between the knee and the hinge.

FIG. 3. Adjustable knee splint with turn-buckle attachment and Hack convalescent boot.

In spite of a discrepancy in fit between the upper splint and atrophic thigh, there is good standing alignment. Stability was adequate for learning standing balance and rudimentary crutch walking prior to fitting permanent braces.

Thus, the function of the adjustable knee splint closely approximates that of a prescribed long leg brace. The knee hinge is optional and may be omitted to reduce cost. However, the knee hinge does allow the patient to sit comfortably while in the splints and application of the splints is facilitated. With a knee hinge a turnbuckle can be attached for stretching knee flexion contractures. (Fig. 3)

It has been our experience that the splint with the dimensions presented in Figure 4 can be adjusted to fit most patients.

Caution. In using the splints one must remember that the calf band may be too deep to block hyperextension at the knee. Therefore, the splints should be used very carefully when hyperextension is present. Further, the knee must not be forced into hyperextension deformity in adjusting the knee pad to a patient.

FOOT-PLATE

Through the use of the commercially available caliper stirrup foot-plate* (Fig. 2B), foot drop is controlled. It is important that the foot-plate be individually adjusted on the shoe in order that the tunnel is perpendicular to the line of progression.

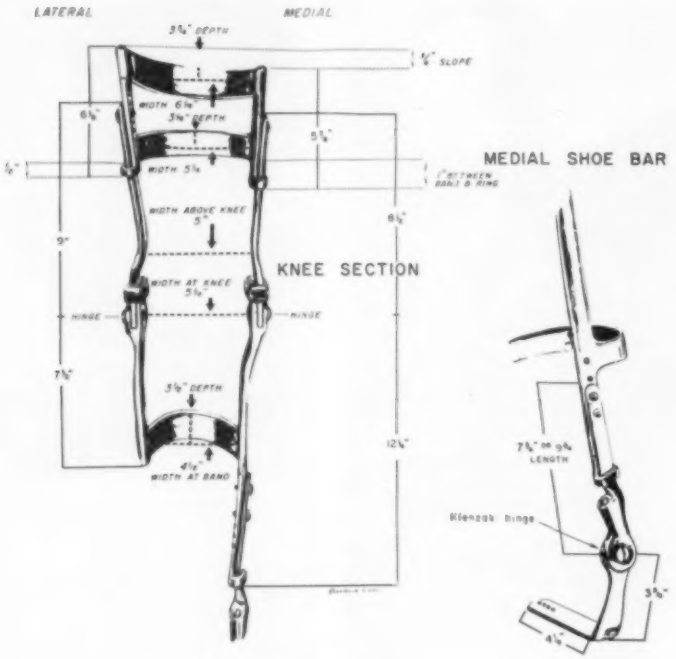

FIG. 4. Dimensions of the adjustable knee splint, for the right lower extremity as shown. Depth and width are inside dimensions.

THE CLAMP

The clamp (Fig. 5B) adds stability in standing when hip control is poor. Figure 5A shows the clamp in place on the splints above the ankle hinge. A small band of adhesive tape under the clamp on one splint (not shown) permits a firm grip on this splint. The other splint is held less firmly, permitting some sliding adjustment as foot contact with the floor changes during each step. Note the undesirable internal rotation with the knees directed inward in Figure 5A. This is due to insufficient toe-out in attaching the foot-plates to the shoe.

ADJUSTMENT FOR STRETCHING KNEE CONTRACTURE

The adjustable knee splint is readily adapted to the task of reducing knee flexion contracture by the use of a turn-buckle attachment (Fig. 3). The turn-buckle brackets are attached to the lower thigh band and the calf band by the two outer screws. The center screws secure the turn-buckle to the brackets. The splint is easily restored to its prime purpose of support of paretic knees by removing either the two outer screws or the center screws, above and below.

For stretching knee contracture, the medial shoe bar is adjusted in length to place the knee hinge slightly caudad to the medial femoral epicondyle. Next, the thigh section is adjusted in length to fit snugly under the gluteal fold and ischial tuberosity. Then, with the knee in a relaxed position of flexion, the knee pad is tightened to place the hinge slightly anterior to the medial femoral epicondyle. It is very important that with each application the knee hinge is slightly inferior and anterior to the axis of knee rotation. Thus, there will be a tendency for distraction rather than compression of the joint surfaces of the knee as the turn-buckle is turned toward extension.

Rhinelander and Ropes[5] in writing of adjustable casts in the treatment of joint deformities advise, "In making an adjustment, care is taken that the cast is not extended far enough to put strain on the affected joint, rather than to support it at rest, as is necessary to relieve muscle

FIG. 5. A. The clamp is on splints above the ankle hinge; undesirable internal rotation results when sufficient toe-out is not provided in attaching the foot-plates to the shoes (note direction in which knees point). B. Clamp to provide stability between the splints.

spasm. In other words, when a cast is adjusted, extension is increased only to the amount of taking up the slack between the present position of maximum extension obtainable without strain and the position at the last adjustment of the hinges." This advice also applies to the use of the turn-buckle attachment. However, when indicated, intermittent forcing at the knee is done only under direct medical supervision. Changes due to pressure on the heel and stress at the neurovascular bundle in the popliteal space are to be watched for particularly. Caution is to be observed especially in the presence of osteoporosis and in conditions in which the joint surfaces are incongruous.

For stretching knee flexion contractures, the Hack convalescent boot (Fig. 3) is preferred to the patient's own shoes. The greater surface area of the heel, the softer leather, and lacing at the heel allow better distribution of pressure. The boot also may be used for ambulation training in lieu of the patient's own shoes.

SUMMARY

The rationale, design, and dimensions of an adjustable knee splint to be used for early training in standing balance and ambulation have been presented. This form of splint has been used with gratifying results in patients with paresis at the knee secondary to a variety of neurologic disorders.

Moreover, the adjustable knee splint can be readily adapted for turn-buckle traction to help stretch knee flexion contracture. For this purpose, the Hack convalescent boot is preferable to regular shoes. The boot is also used in ambulation training when adaptation of the patient's own shoes is not practical.

Acknowledgment. I gratefully acknowledge the suggestions in design and the fabrication of the splints offered by Mr. Peter C. Bonicalzi and Mr. Phillip Harkov, C. O. & P., orthotists at Letterman General Hospital. I also wish to thank Mrs. Rosebud Lane Preddy, Medical Illustrator, Letterman General Hospital, San Francisco, California for the drawings.

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If your doctor knows only medicine, you may be sure he does not know even medicine.—MARK TWAIN

Case Reports

Follow-up of a Pallidotomy Patient

Henry C. Wessman, B.S.*

There are times, due to extremely slow progress, when patients must be discharged from the larger rehabilitation centers before they are up to their highest level of activity. Many of these patients go back to nursing homes for care. If given the opportunity, these patients will continue their slow improvement, carrying it at times to a surprisingly high level.

The patient discussed herein, a fifty-one year old male, has a history of long-standing post-encephalitic Parkinson's disease. The Parkinson syndrome was first noted following an attack of "sleeping sickness" at the age of twenty. The chief disability resulting from the disease was a general cog-wheel rigidity. This led to contractures, particularly of the right upper extremity. The disability gradually grew worse, and by the time the patient was thirty-seven years old he was very despondent and unable to care for himself.

Pallidotomy was first suggested at the University of Minnesota Hospitals in 1957. The patient was then forty-eight years old; therefore, the prognosis was felt to be favorable for surgery. In March 1958, a right pallidotomy was successfully performed. The patient did well postoperatively, with complete relief of rigidity of the left extremities. Upon discharge from the hospital in April 1958, the patient was able to feed and toilet himself, adjust his own clothing, and perform transfers independently. He was returned to the Bethesda Nursing Home and continued to progress. By October 1958, he was ambulating independently.

The patient was readmitted to the University of Minnesota Hospitals in March 1959, for a left pallidotomy. The surgery was performed in May 1959, with excellent immediate postoperative results. However, a few hours after surgery the patient exhibited a severely depressed level of consciousness, right hemiplegia, and pseudobulbar palsy. He had difficulty speaking and swallowing, and was once again unable to care for himself.

The patient was referred for activities of daily living (ADL) training and beginning ambulation. Progress was noted but it was extremely slow. Because of this it was thought that the patient would benefit by being transferred to a nursing home where physical therapy could be continued. The patient was transferred to the Oak Ridge Nursing Home on July 3 1959, and remained there until July 31 1959. At this time the patient was once again returned to the University of Minnesota. The main problems that still remained were lack of balance, right hemiplegia, and poor concentration.

Discharge from the University Hospitals to the Bethesda Nursing Home came in September 1959. While it was apparent the patient had not responded to the extent anticipated in his rehabilitation program at the University, he had continued to show some improvement. There still remained a lack of concentration, and along with this a seeming lack of motivation. The patient still had a balance problem, although his strength was improved somewhat. He needed considerable assistance while ambulating, which made the prognosis for free ambulation at this time rather poor. In ADL training he was unable to transfer or dress himself independently, although he was able to feed himself. The patient had again made very slow progress, and this was the reason for transfer to a nursing home.

He was first seen by the local Physical Therapist in October 1959. The condition of the patient at this time was much the same as at the time of discharge from the University Hospitals. Constant supervision was required for all dressing and transfers. Ambulation was still poor, but a program of daily walks with the aid of a walker was started. Along with this the nursing home staff was encouraged to allow the patient to be as independent as possible when transferring, eating, and dressing.

Left to the supervised care of the nursing home workers, the patient progressed slowly but steadily. In July 1960, the local Physical Therapist was once again called in to take an active

* Supervisor of Physical Therapy, Bethesda Hospital, St. Francis Hospital, Crookston, Minnesota.

part in the patient's treatment. A regimen of stretching, progressive resistive exercise (PRE), gait training, and ADL training was begun. The patient this time seemed more mentally alert, and had greater motivation. He progressed faster in all phases of treatment over the next four months. Voluntary movement of the right upper extremity increased with stretching and PRE. The patient was now able to lift the right arm from his side and forward flex or abduct the arm to a horizontal position. Full range of flexion and extension of the elbow was also under voluntary control, as was a limited range of supination and pronation. Motion of the fingers was still limited, although the patient had developed a functional grasp, and was slowly working the fingers into extension by daily stretching. Ambulation, with training directed at better balance, also improved. The patient worked his way up from the walker, to crutches, to one crutch, and finally to independent ambulation which included ascending and descending stairs. Improvement was also noted in ADL. Transfers were independent, and the patient learned to toilet himself adequately. Independence in dressing and undressing was also a reality as time progressed.

The patient has shown steady improvement over the months prior to this writing. It is encouraging to note that his prognosis is no longer as dark as it once was. Complete self-care is now a reality for the patient, and perhaps some simple vocational task may be possible in the near future.

Acknowledgment. Thanks to Dr. A. R. Reff of the Crookston Clinic for furnishing the history of the patient and guiding the rehabilitation efforts.

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Suggestions from the Field

Cervical Traction Apparatus

Michael Oliva, M.A.*

An increase in the number of prescriptions for cervical traction combined with moist heat has made it necessary to devise a means of administering cervical traction with the patient in a supine position. There is equipment on the market designed specifically for this, but most of it is very costly. This department approached this problem by developing an inexpensive, easily adjustable cervical traction apparatus. Constructed of durable material, it is easily assembled. The angle of pull can be readily adjusted and the device can be used on a number of plinths.

Description and Operation

The mounting bracket consists of two steel plates "A" and "B" welded together as illustrated (Fig. 1). Plate "A" has four ¼ inch holes for bolting the apparatus against the plinth. A 7 inch piece of galvanized pipe (C) which has a 1 inch inside diameter is welded to the free end of "B". "C" is grooved at the top to accommodate the locking bolt (F) (Fig. 2).

The vertical arm pulley consists of a 28 inch length of steel tubing (E) with a small pulley (D) welded to one end. The outside diameter of "E" is $^{29}/_{32}$ inch which is small enough to fit inside "C". Approximately 5 inches from the top, "E" is bent 40°. From this point down, holes large enough to fit the locking bolt (F) are drilled through "E".

The locking bolt (F) is a large metal bolt longer than the outside of "C". The mounting bolt (G) consists of a screw, wing nut and two washers from the bottom of an adjustable wooden crutch. Four such bolts should be used.

The rest of the apparatus in Figure 1, including the weight pan partially shown in the lower right corner, is usually standard equipment in a physical therapy department.

The operation of this apparatus is simple. To vary the angle of pull, the vertical arm is raised

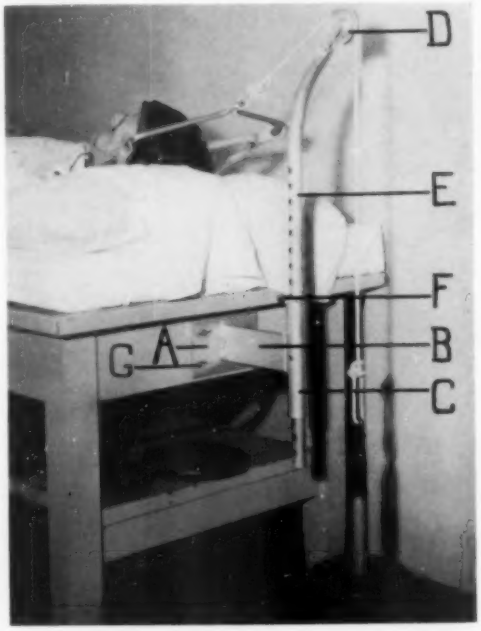

Fig. 1

Fig. 2

* Senior Assistant Physical Therapist, USPHS Hospital, Staten Island, New York.

or lowered to the desired height. The locking bolt is inserted in the hole nearest the top of "C" and is allowed to drop into the groove.

CONSTRUCTION HINTS

1. The length of "B" depends on the amount of overhang on the plinth. If this is considered there will be no unnecessary protruding of the mounting bracket from the plinth.

2. The locking bolt can be made from a long metal bolt with a smooth shaft and short threaded end. The threaded area should be removed.

3. "E" should be bent after the pulley is welded in place making sure the pulley stays in proper alignment with the bent portion and long axis of "E". The holes in "E" are perpendicular to the pulley.

4. The groove in "C" should be made last. After the mounting bracket is attached to the plinth, place "F" in one of the holes in "E" and place "E" in "C". Align the pulley with the long line of the plinth, mark "C" on both sides of the locking bolt and then cut the groove. The depth of this groove should be at least the diameter of "F" to prevent it from jumping out if the plinth or apparatus should be jarred.

5. The welding can be done in the hospital maintenance department or in a body and fender shop.

MOUNTING APPARATUS

Drill holes in the end of a plinth to correspond with the holes in plate "A" and secure the four mounting bolts. If the apparatus is to be used on more than one plinth, drill the four holes and counter sink them $\frac{3}{8}$ inch on the outer surface of the plinth. Cut the wings off four additional wing nuts so as to have four coneshaped nuts. Cut a small groove in the base of each cone nut. Fasten the screws to the plinth with the coneshaped nuts fitted into the counter sunk areas (Fig. 2). This can be done with two screw drivers, one screw driver holding the cone shaped nut by the groove in its base. The screws thus held firmly in place will not fall out when the mounting bracket is removed or mounted. Also, the wing nuts can be loosened or tightened without the screws turning. This makes for easy removal and mounting. Fasten, as described above, on each plinth on which the apparatus is to be used.

Index to Current Literature—continued

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Editorials

Legislative Trends in Rehabilitation

Probably the most impressive feature about rehabilitation legislation as we see it today in Washington is the volume of it. Only a few years ago, legislative proposals in rehabilitation were few and far between. Few legislators, and few Congressional committees, took much notice of it, largely because few people, in or out of the Congress, had yet comprehended rehabilitation as one of the major tools for dealing with the problems of disability and dependency among the American people. The Office of Vocational Rehabilitation seldom had business with more than one legislative committee in each of the houses of the Congress.

During the last Congress (1959-1960) the Office was involved with nine committees on a long and varied list of subjects which included increased rehabilitation services for older people, the blind and the deaf; rehabilitation facilities; disabled workers under Old Age and Survivors Insurance coverage (Social Security); mental retardation; sheltered workshops; surplus property for centers and workshops, international health and rehabilitation research, and others.

In varying degrees, much the same thing has been happening in the states, where the volume of legislation aimed at improving rehabilitation by both public and voluntary agencies has risen sharply.

Certain bills pending in Congress now have major implications for the future of rehabilitation work. One is the proposal to provide "independent living" rehabilitation services to disabled individuals through the federal-state grant-in-aid program of vocational rehabilitation. These bills are aimed at one of the great problems today—severe disability among our people, of all ages and in all parts of the country. The legislation reflects the growing amount of technical knowledge on the part of physical therapists, physiatrists, other medical specialists, prosthetists, rehabilitation counselors and nurses, and others who make up the rehabilitation team. It reflects, as well, the growing confidence in the ability of rehabilitation to deal effectively with severe disability. And finally, I believe it indicates an awakening of our social conscience, a demand that the knowledge we have in our hands today not lie unused while thousands of disabled people vegetate needlessly.

Such an "independent living" program could improve the functional ability of thousands of disabled people, without regard to whether they would be able to perform jobs when services are completed (an ultimate job objective for the disabled person is a requirement upon state agencies under present law). We know that some of these individuals would become able to work, and that the others, the majority, would at least be able to care for their personal needs and be self-sufficient within the home. Hundreds of physical therapists know this picture, and the often remarkable results of physical retraining, from their daily work with such patients.

Another bill of importance to rehabilitation is the "Health Insurance Benefits Act of 1961" proposed by President Kennedy, which would provide payment for certain costs of hospital, skilled nursing home and home care program services for persons age sixty-five and above who are covered under the Old Age and Survivors Insurance program (Social Security). Along with other services in these three types of care programs, payment would be authorized for medical rehabilitation services which are available as part of the regular services. Also, payment could be made for inpatient services in rehabilitation centers, when this type of care

is most appropriate for the patient, within the total numbers of days of care authorized for reimbursement.

This can have tremendous benefits in getting rehabilitation services to patients promptly after acute care, and in transforming routine custodial care of chronic patients into dynamic restorative programs. One certain result would be to enlarge greatly the role of the physical therapist in hospital, nursing home and home care programs, with a consequent demand for more qualified physical therapists.

These and other legislative proposals now before the Congress have important implications for physical therapy and for all public and private rehabilitation programs. They all point to one clear fact: Physical therapy faces a future of pronounced expansion—in responsibility, in opportunity and, I hope, in size. Much of the success of the whole rehabilitation movement will depend upon what happens in your profession during the next ten years.

MARY SWITZER, *Director*
Office of Vocational Rehabilitation
U. S. Department of Health, Education, and Welfare

Editorial

Abstract from a letter to the Secretary from one of our subscribers: "The P. T. Review received. I like it, but don't see how you can afford to publish it for one dollar. The dollar is so weak in purchasing power at the present time.

I think that if all the PT's were willing to boost this baby magazine until it is able to walk alone, it would repay all of us. I would suggest doubling the price. I am ready to do so on notification."

The Editors appreciate a letter like this, especially now, as the Treasurer has sent word that many of our members are not paying their dues, and that the Association will be a thing of the past if those who have been members drop out and others who can qualify for membership just subscribe to the *P. T. Review* instead of joining as members and help to push the load.

Think it over, PT's. The Association is here to serve you, the *Review* is yours forever if you want it, but neither can thrive unless they are fed by the loyalty, interest and dues from a united group of PT's throughout this great country of ours. *P. T. Review*, December 1923.

Letter to the Editor

In reading *The Physical Therapy Review* we learned that you are celebrating the 40th anniversary of your journal.

Fraülein v. Mülmann as editor of our journal, *Krankengymnastik*, and I congratulate you on this event. We hope that the journal will flourish in the future and send our heartiest good wishes.

IRMGARD KOLDE
Zentralverband Krankengymnastik E. V.
Western Germany

In the February issue of *The Physical Therapy Review*, there was an editorial by Kathryn Shaffer, "On Reading Other Journals."

I personally subscribe to only the *Physical Therapy Review*, but I regularly read articles in four other journals *(American Journal of Physical Medicine, Archives of Physical Medicine and Rehabilitation, Journal of Bone and Joint Surgery* and *Neurology)*. The *Review* publishes an Index to Current Literature which includes numerous journals. I have had occasion to consult many of these and to read articles of personal interest.

Miss Shaffer's statement that we should be reading more professional literature needs to be emphasized. However, it might be misleading if Miss Shaffer reached the conclusion that physical therapists are not reading enough on the basis of subscriptions to professional journals other than the *Physical Therapy Review*. I feel that many therapists are reading borrowed journals by making use of medical library facilities.

It might be interesting for the *Review* to survey the membership asking, "What other professional journals do you read regularly?"

JOHN L. ECHTERNACH
3045 St. Paul Street
Baltimore 18, Maryland

Association News

New Student Members

Marquette University

Julie C. Gerlach — Barbara A. Westenberg

New York University

Carol L. Speidel

Simmons College

Arlene B. Feingold

University of Connecticut

Elaine A. Bernier
Susan Broughton
Judith E. Holbrook
Eugene W. Martin
Isabel M. Meskill
Denise C. Poulin
Mary R. Stanley
Gail F. Vernon
Durell Whiting

University of Florida

Carolyn V. Griffin — John P. Melton

University of Minnesota

Barbara J. Allen

University of Puerto Rico

Margarita Arce-Cruz — Yolanda M. Igaravidez-Orengo

University of Wisconsin

Nancy A. Couper — Joan E. Reinert

Mary E. Sutton

Marriages

Julia K. Bondurant of Chicago, Ill., now Mrs. Julia B. Gertz, Chicago,

S. Moyra Corrigan of Waterbury, Conn., now Mrs. S. Moyra Corrigan Trein, Porto Allegre, Rio Grande do Sul, Brazil.

Linda L. Choice of Berkeley, Calif., now Mrs. Linda C. Doig, Concord, Calif.

Vicki Crosby of Los Angeles, Calif., now Mrs. Vicki Post, Hermosa Beach, Calif.

Mrs. Edward Duffy of Arlington, N. J., now Mrs. George Roszkowski, Arlington, N. J.

Mary P. Dunlap of Dallas, Tex., now Mrs. Mary P. Ecuyer, New Orleans, La.

Anne-Marie Grates of New York City now Mrs. Anne-Marie Roth, Eastchester, N. Y.

Joan Lewis to Hutchison A. Nenzel of Reno, Nevada.

Wernette B. Lindquist of Portland, Oregon now Mrs. Wernette B. Whitaker of Dillingham, Alas.

Geraldine Redden of Montgomery, Ala., now Mrs. Geraldine Boyd, Montgomery.

Ardis B. Stewart of Seattle, Wash., now Mrs. Robert Gerald Snitzler of Seattle.

Members' Publications

Sara J. Houtz, Detroit Orthopaedic Clinic, is author of an article entitled "Illustrations and Graphic Methods," published in *The Journal of the Michigan State Medical Society*, February 1961.

Washington Physical Therapy Practice Act Amended

On March 6, 1961, Governor Albert D. Rosellini signed into law Substitute House Bill Number 16, hereby amending Chapter 239, Laws of 1949, and appropriate sections of the Revised Code of Washington. The law, as amended, now states: "Any person who shall practice or attempt to practice as or hold himself out as practicing as a physical therapist in this state without having at the time of so doing, a valid, unrevoked certificate as provided in this chapter, shall be guilty of a gross misdemeanor."

Examinations will be waived for those who are currently registered in the State of Washington or who have practiced in Washington for a continuous period of three years and are presently practicing in the State. Provision is also made for foreign trained physical therapists who have passed the examination of the American Physical Therapy Association (provided by the Professional Examination Service of the American Public Health Association). Application must be made on or before September 1, 1961.

Revised educational qualifications require "four academic years of collegiate instruction." A "probational certificate" of registration may be issued to foreign trained physical therapists who meet the requirements of the law.

The initial registration fee remains $25.00, but the renewal fee, which is due every third year, has been changed from $5.00 to $15.00. The amended law now provides for endorsement rather than reciprocity.

Governor Donald G. Nutter signs House Bill No. 94 in presence of Gordon B. Jones, President, Montana Chapter. (See May *Review*, p. 363.)

Maryland Law Amended

The Annotated Code of Maryland has been amended "to revise the physical therapy laws of the State with respect to the definitions of physical therapy and physical therapist, the suspension and revocation of licenses, prohibited acts and the penalty for violations of the physical therapy laws" when Governor Millard Tawes signed House Bill No. 360 on May 8, 1961. The amendments include an increased penalty for violation of the law, from $100.00 to $1,000.00, and "the practice of physical therapy other than under the written or verbal order of a physician licensed to practice medicine and surgery" is now grounds for refusal to license, or to suspend or revoke a license. Previously, the prescriptive relationship with physicians was included in the definition of physical therapist. The Act became effective on June 1, 1961.

Chapter News

LOUISIANA

The Chapter meeting, held in Opelousas April 15, included scientific programs on back and knee injuries, a cerebral palsy clinic tour, and social events as well as the annual business meeting.

LOUISIANA—NORTHERN DISTRICT

As a part of its exhibit for the Medical Progress Exhibit at the State Fair, the District arranged to show the film, "The Return". Members of the District and volunteers also prepared and manned a booth which displayed recruitment literature, professional equipment and appliances, and photographs of patient treatment.

The Education and Recruitment Committee distributed to the Shreveport ministry recruitment literature for use in counseling the young people during the year.

MICHIGAN—EASTERN DISTRICT

The District newsletter has a column "Items Re: Many Things". The April issue column, in addition to personnel items, suggests that lengths of tubing used for tropical fish aquaria can be used by cerebral palsy patients for practice drinking straws.

Lura Arlin Rhoades of Pittsburgh, Pennsylvania died on May 15, 1961 after a long illness. A graduate of Battle Creek College, Battle Creek, Michigan she became the 287th member of the APTA in 1922. She worked as a physical therapist at Battle Creek Sanatorium and then moved to Children's Hospital at the University of Iowa where she did graduate work at the University, as well as physical therapy. In 1923 she married Ralph O. Rhoades and from 1927 to 1940 they lived in Europe, the Near East and the Far East. The Rhoades have made Pittsburgh their home since the early 1940's. Lura Rhoades, despite serious illness, maintained a keen interest in physical therapy and was made a life member of the Association in 1954. At the time of her death she was a member of the Pennsylvania Chapter, Western Pennsylvania district. She is survived by her husband, Ralph O. Rhoades, a Director and formerly Chairman of the Board of Gulf Oil Corporation.

Lois A. Stegkemper, East Cleveland, Ohio, passed away in April 1961 at the age of fifty-three. Miss Stegkemper attended Sargent School of Physical Education prior to graduation from the New Haven School of Physical Therapy in 1929. She was employed in the Cleveland area for twelve years before entering the military service in 1941. As a member of the Army of the United States, she had assignments in Florida, Colorado, and Missouri, as well as overseas. Miss Stegkemper transferred to the U. S. Air Force and was stationed at bases in New York, Texas and Illinois. She retired from the Air Force in 1958 with the rank of Captain. Miss Stegkemper, an Association member since 1930, was a past treasurer of the Cleveland Chapter. She was an inactive member of the Ohio Chapter, Northeastern District at the time of her death.

Doris Anne Burnette, Ft. Lauderdale, Florida died on November 29, 1960 following a very brief illness. Miss Burnett was twenty-eight years of age. She received a bachelor of arts degree in physical education from Lander College, Greenwood, South Carolina prior to entering physical therapy. She received her certificate in physical therapy in 1956 at the School of Physical Therapy, Medical College of Virginia. Miss Burnett was employed at the Medical College of Virginia upon graduation and remained there until the fall of 1957. She moved to Florida and accepted a position at the Broward County Society for Crippled Children and Adults in Ft. Lauderdale. Miss Burnett became an APTA member in 1957. She was a member of the Southeastern District-Florida Chapter and served as its Secretary from 1958 to 1960.

Education

APTA-OVR Institute

The seventh annual APTA-OVR Institute for physical therapy teaching personnel was held at the Extension Study Center, University of Oklahoma, April 16 to 21, 1961. Eighty-four representatives of schools offering approved courses in physical therapy attended the program which was titled "Clinical Education for Physical Therapy". Discussions centered on the importance of clinical education and how it should be developed as a part of the total educational program.

The faculty was composed of six physical therapists; three physical therapy school directors and three clinical instructors. Participants were also from the administrative and clinical aspects of physical therapy education.

The "Goals for Clinical Experience", "Criteria for Participation by Clinical Facilities in Physical Therapy Education" and guides for "Planning Programs for Clinical Education", developed during workshop group discussions, will be included in a manual to be published by the end of this year. These and other products of the Institute will also be included in a projected handbook for physical therapy educators.

Correction

The *Review* regrets the publication of two errors in the article entitled "The Physical Therapist as Educational Administrator" published in the June issue, page 463. The opening paragraph of the article should have read as follows: "Essentials of an *Acceptable* School of Physical Therapy" published by the Council *on* Medical Education and Hospitals of the American Medical Association (1955) has advocated certain minimum qualifications for the institutions and persons responsible for "the organization, periodic review, continued development and general effectiveness of the educational program."

SHORT TERM COURSES FOR GRADUATE PHYSICAL THERAPISTS

Title of Course	*Sponsor of Course*	*For Details Contact*	*Dates of Course*
Cerebral Palsy	The North Carolina Cerebral Palsy Hospital Durham, North Carolina	Lenox D. Baker, M.D. Medical Director No. Carolina C. P. Hosp. Durham, North Carolina	Courses arranged according to individual need—duration 3 months
Cerebral Palsy Technics of Treatment	Children's Rehabilitation Institute for Cerebral Palsy Reisterstown, Maryland	Christopher H. Wiemer Executive Director Children's Rehab. Inst. Reisterstown, Maryland	July 3—Sept. 15, 1961 Oct. 2—Dec. 15, 1961
Theory and Technic of Treatment and Care of Neuromuscular and Musculoskeletal Disorders	Georgia Warm Springs Foundation Warm Springs, Georgia	Robert L. Bennett, M.D. Director Ga. Warm Springs Found. Warm Springs, Georgia	June 16 or Sept. 8, 1961 Sept. 25, 1961 Dec. 15, 1961 or Mar. 23, 1961
Technics of Neuromuscular Facilitation	California Rehabilitation Center Vallejo, California	Margaret Knott, Chief P.T. Calif. Rehab. Center Vallejo, Calif.	April 1 July 1 October 1
Graduate Physical Therapy Program	Rancho Los Amigos Hospital Downey, California	Chief Physical Therapist Rancho Los Amigos Hospital 7601 E. Imperial Highway Downey, California	2nd Monday in March to 1st Monday in Sept. 2nd Monday in Sept. to 1st Monday in March

Advanced Physical Rehabilitation Methods for Physical/Occupational Therapists	New York University Medical Center—Institute of Physical Medicine and Rehabilitation (in cooperation with New York University School of Education)	Edith Buchwald Lawton, Director, Postgraduate Education for Paramedical Personnel, New York University Medical Center, Institute of Physical Medicine and Rehabilitation, 400 East 34 Street New York 16, N. Y.	Nov. 13—Dec. 8, 1961 Feb. 5,—Mar. 2, 1962 April 30—May 25, 1962
Neurophysiology in the Treatment of Neuromuscular Dysfunction (P. T. 511)	U. of So. California Physical Therapy Dept. University Park Los Angeles 7, Calif.	Margaret S. Rood U. of Southern California	Oct. 9—20, 1961
Anatomy for Therapists (P. T. 502a)	U. of Southern California Physical Therapy Dept. University Park Los Angeles 7, Calif.	Roxie Morris U. of So. California	July 31—Aug. 25, 1961
Cystic Fibrosis (Physical Therapy in the Treatment of Cystic Fibrosis)	Children's Hospital Medical Center	Shirley M. Cogland Director, Physical Therapy Children's Hospital Medical Center 300 Longwood Avenue Boston, Mass.	Sept. 18-21, 1961

Films of Interest

The Doctor Defendant—30 min., b/w, sd., 1957. The William S. Merrell Co., Cincinnati 15, Ohio. Four legal actions against physicians are presented to show circumstances leading to professional liability actions and the necessity for the medical expert witness to understand the special environment of a court of law.

Tendon Injuries—28 min., color, sd., 1953. American Cyanamid Company, Surgical Film Library, 1 Casper Street, Danbury, Connecticut. This films shows in detail the insertion of a tendon graft into a digit. It also includes a nerve graft and a brief demonstration of the healing process of tendons.

Biceps Tendon Transference for Recurrent Dislocation of the Shoulder—20 min., color, silent, 1950. Surgical Products Division, American Cyanamid Co., Danbury, Connecticut. A film showing the Nicola technique for repair using the long head of the biceps and a strip of the coracohumeral ligament.

Fascial Transplantation for Paralyses of the Abdominal Wall—11 min., color, sd., 1958. E. R. Squibb and Sons, 745 Fifth Avenue, New York 22, N. Y. This film describes the Lowman technique of fascial transplantation in paralysis of the abdominal muscles. Several post-polio patients are shown before and after the operation. The mechanical and physiological effects of abdominal muscle paralysis are discussed, and the operative technique is shown by drawings and surgery. Postoperative physical therapy is also shown.

Exploration of the Sciatic Nerve in the Thigh—11min., color, sd., 1959. Medical Illustration Service, Veterans' Administration, 2002 Holcombe Blvd., Houston 31, Texas. This film shows the clinical findings in a complete paralysis of the sciatic nerve and an operative exploration. A neurolysis is done, a neuroma resected, and an end-to-end suture. Postoperative return of function eight months later is shown.

Motion Economy as Applied to Hospital Activities—22 min., color, sd., 1958. Service charge $2.00. American Medical Association, Motion Picture Library, 535 N. Dearborn Street, Chicago 10, Illinois. One of a series of films on work simplification, this film presents the principles of motion economy and illustrates the principle successfully applied in several areas of the hospital.

The Patient is a Person—20 min., color, sd., 1956. Service charge $1.00. American Medical Association, Motion Picture Library, 535 N. Dearborn Street, Chicago 10, Illinois. Shows the fears and attitudes of patients and how they are influenced by all hospital workers, both medical and non-medical. Suggests ways in which the attitude of non-medical workers can contribute to the patients' recovery.

Proud Years—28 min., b/w, sd., 1956. Rental: 1 day, $5.00; 2 days, $7.25. Local Heart Association or American Heart Association Film Library, 267 West 25th Street, New York 1, N. Y. This film has to do with the care of the aged. It presents the day-to-day problems of handicapped elderly persons and shows some practical steps that can be taken to keep such patients active and useful.

Office Supervisors' Problems—A series of six short films; 6 to 8 min., b/w, sd., 1957. Rental $4.00 each. ANA-NLN Film Library, 267 West 25th Street, New York 1. N. Y. Titles: The Follow-Through; The Grapevine; How Much Co-operation; In the Middle; Promotion By-Pass; and The Bright Young Newcomer. Produced in collaboration with the film committee of the National Office Management Association, these films were designed to stimulate discussion in supervisory training sessions. They focus on problems in human relations. (The distributor prefers that the films be booked individually).

Abstracts

Foot and Leg Cramps

Albert Fields (Los Angeles, California), AMER. PRACTIT., 11:799-806, September 1960

The etiology of many cases of foot and leg cramps is obscure. There appears to be a heightened excitability of the motor units involved, with asynchronous contraction. In cramps, the rate of contraction of a single muscle fiber may reach 300 per second. Anything that interferes with the nutrition and ion exchange of normally innervated skeletal muscle may cause cramping. Unusual muscle effort, pregnancy, disturbance of mineral metabolism, weakness in neighboring muscles, and circulatory deficiencies are often associated with leg cramps.

A multiple therapy routine consisting of diet regulation, medications, foot care, foot and leg exercises, and a list of special precautions, is suggested to control the problem of leg cramps.

The Hemiplegic Patient

A. B. Baker (Division of Neurology, University of Minnesota Medical School, Minneapolis), J. Lancet, 80:455-458, October 1960

The clinical diagnosis of hemiplegia is not difficult, but finding the factors causing the condition may be a problem since treatment must be directed toward the specific etiologic process. The age of the patient can serve as a guide to etiology, since different pathologic processes are characteristic for different age groups.

The immediate care of the hemiplegic patient consists of diagnosis, treatment aimed at the causative factors, and general medical and nursing care. Although the primary cause has been treated, hemiplegia may persist. The patient must then be taught to ambulate and to care for himself.

Rehabilitation can be started early in the course of recovery. Passive movement and proper positioning of the limbs in bed will prevent deformity. The use of the affected limb in self care activities should be encouraged. Ambulation can start as soon as the patient is strong enough to bear weight on the affected limb. Under adequate guidance, the patient's family can carry out the rehabilitation procedures at home.

Most patients with hemiplegia are capable of ambulation if given adequate rehabilitation therapy. Some complications may make progress difficult. Intellectual impairment is the most serious complication and the prognosis for successful rehabilitation is poor. Other complications are seizures, speech disturbances, and pain. This burning searing pain, which involves the upper limb and face, occurs about four to six months after onset. It is due to involvement of the thalamus and may often be intractable to any type of treatment.

A Comparison of Visuosensory and Visuomotor Disturbances in Right and Left Hemiplegics

D. B. Karlin and S. Hirschenfang (Jewish Chronic Disease Hospital, Brooklyn, New York), AM. J. OPHTHAL., 50:627, October 1960

This paper presents the results of a study of right and left hemiplegics to determine the degree of visual impairment. Studies of Karlin, *et al.*, demonstrated the left hemiplegics had more serious involvement of the intellectual and linguistic areas.

Sixteen patients with right and twelve with left hemiplegia were subjects for this study. Each subject received the following tests: central and peripheral visual fields, the performance scale of the Wechsler adult intelligence scale (WAIS), tests for aphasia, and the Bender gestalt test. Immediately following the onset of the cerebrovascular accident, the majority of patients demonstrated hemonomous hemianopsia. At the end of six months, none of the right hemiplegics, ten of whom had aphasia, demonstrated hemonomous hemianopsia. Three of the left hemiplegics, none of whom had aphasia, did have homonomous hemianopsia. On the performance scale of the Wechsler scale, the left hemiplegics scored lowest of the two groups. The left hemiplegics also exhibited more disturbance on the Bender gestalt test. Despite the fact that the right hemiplegics were physically handicapped on their dominant side and the left hemiplegics were not, none of the latter was able to reproduce the designs correctly while five of the former were able to do so. Only three right hemiplegics were found to have visual agnosia, yet all of the patients showed impaired function on the Wechsler scale and the Bender gestalt. The authors conclude from this that the damage lies in areas of the brain which integrate visual perception and performance. The results of this study support other studies which have shown that, although left hemiplegics have been considered good rehabilitation candidates, their greater visuomotor and visuosensory loss may be a more serious problem than the aphasia common in right hemiplegics.

The Purpose of Physiotherapy in the Treatment of Recent Injuries

P. S. London (Birmingham Accident Hospital, England), PHYSIOTHERAPY, 46:279-290, October 1960

Physical therapy, based on knowledge of the effects of the injury, structure and function, and of how healing can best be promoted, aims to restore function quickly. The first need may be to save life and render the patient fit for major surgery. Head and chest injuries may embarrass respiration. Bandages and posture reduce swelling, and splints ensure that any unavoidable stiffness will not be accompanied by preventable deformity. While the patient is unconscious the physical therapist keeps the lungs clear and prevents deformity. Trivial rib fractures can be fatal in old people and those with respiratory disability. Pain that restrains breathing, and prevents effectual coughing should be relieved.

Fractures often involve soft tissue damage. Blood vessels within the bone and those running between bone and periosteum will be implicated. Periosteum may be torn; muscles, tendons, ligaments and nerves lacerated; fascia split, and

skin breached. As soon as possible, purposeful activity should be introduced, not to disturb healing within the injured structures, but to break up exudate between, and to ensure supple tissue, rather than scar tissue. Normal patterns of sensory impulses are then established and do much to displace pain. Early movement is important when it is impossible to fix a fracture into a joint. Hematomas are dispersed and absorbed and the bearing surface is molded. Immobilization until bone unites allows tissue to fuse into a mass of unyielding scar.

Athletic injuries require the same treatment whether they affect athletes or sluggards, but there are important differences in motivation. Many severe tears and ruptures are worth repairing surgically as soon as possible. Carefully supervised movement begins three weeks afterward, but full strength of repair takes about six weeks. A relatively unimportant sprain and severely torn ligaments or fracture all exhibit pain, swelling, and protective activity of muscles. X-ray and examination under anesthesia aid diagnosis. Sprains are usually best treated by protected activity. A torn ligament or muscle is not very painful until it has become swollen. Swelling should be treated by firm support, elevation, and movement which promotes local circulation and exercises a dispersing effect upon the traumatic effusion. In the early stages pain is relieved and function restored by analgesics. Friction, elastic support, and plaster of paris may relieve persistent pain.

"Shin splints" is a painful swelling affecting extensor muscles in the leg after unaccustomed exercise. Gentle activity and elevation suffice, but occasionally fasciotomy is required to decompress the muscles which otherwise might undergo ischemic contracture. Protected activity, massage, and hydrocortisone are successful with tenosynovitis. Sprains are often accompanied by avulsion of small pieces of bone. If the joint is stable and the fragments have not been widely displaced or rotated the fracture can be ignored. Otherwise, surgical repair is necessary. Fatigue fracture occurs in bone repeatedly stressed, such as second metatarsal "march fracture." Swelling, strictly localized tenderness, and pain during activity may be present for some time before X-rays show any abnormality.

In the absence of disease or signs of pressure on a nerve root, severe pain in the back demands rest and analgesics. Milder discomfort is treated by belt, exercises, heat, injection, manipulation, massage, and traction. Recurrent dislocations do not necessarily need operation for they may not hinder the chosen sport. The criterion of successful reduction of a torn meniscus is a feeling of comfort with the restoration of full extension; quadriceps should be trained to support the injured knee and to disperse effusion; a splint is worn only during play.

Treatment for Muscle Spasm with Physical Therapy and a Central Relaxant

Eugene J. Rogers, New York J. Med. 61:120-123, January 1, 1961

There are several factors that affect the muscle function, tone, spasm and spasticity of skeletal muscles in conditions such as: fibrositis, myositis, myalgia, arthritis, bursitis, radiculitis, Parkinsonism and hemiplegia. The amount of pain present, the patient's emotional reaction to the situation, and the basic etiology of the disorder have an effect which is variable with each individual. Yet the relief of muscle spasm by the interruption of abnormal motor responses and the breaking of "the vicious cycle of spasm and pain" is of proved value in allowing muscle re-education, increased function and the prevention of disuse deformity in all of these conditions.

A statistical evaluation was done of fifty patients with the conditions mentioned above treated by physical therapy with and without adjuvant drug therapy. The purpose of the study was to do a clinical evaluation in the field of rehabilitation of a new muscle relaxant and tranquilizer, chlormezanone (Trancopal). The analysis of the effectiveness of the drug was based on the extent of amelioration of the patients' complaints. First prepared by Gesler and Zurrey, chlormezanone appears to have a suppressant effect on excess motor activity by action on the polysynaptic subcortical reflexes, and in addition, it has a tranquilizing effect which reduces emotional reinforcement of motor spasm impulses. For the purposes of the study, a complete physical examination, hemoglobin, and urinalysis tests were performed initially and were repeated at two weeks intervals or sooner on each patient. Twenty patients were given chlormezanone; ten patients were started on placebos and twenty patients were given chlormezanone and aspirin. Physical therapy was utilized as appropriate in all cases. Medication was changed in sequence each week and the average duration of therapy was more than two weeks. Symptoms of muscle spasm or spasticity had been present for two days and as long as seven years.

The results of the study indicated that the addition of a safe and well tolerated central muscle relaxant, chlormezanone, to physical therapy was a useful adjuvant in the treatment of muscle spasm.

Is Radiological Examination of the Twisted Ankle Necessary?

J. S. Garfield, Lancet London, 2: 1167-1169, November 26, 1960

This study was done to assess the value of radiology in determining the treatment of injuries of the ankle, and to define the indications for such examination.

One hundred eleven patients with twisting injuries of one ankle were examined within twenty-four hours of injury. Radiographs of the ankle in the neutral position were taken in an anteroposterior and lateral projection.

Results showed that three groups of injuries could be defined: (1) major fractures requiring open or closed manipulation and immobilization in plaster; (2) minor fractures which responded as well to strapping as to immobilization in plaster and; (3) ligamentous injury without bony damage, requiring only strapping for treatment.

It was found that clinical features alone in the absence of radiological examination gave an unequivocal guide to diagnosis only in patients in one of the following categories:

1. The absence of any swelling was a firm indication of the absence of any significant bony or ligamentous damage, whatever the circumstances of injury.

2. Tenderness localized to the base of the fifth metatarsal was a sure indication of fracture in this site only.

3. The absence of one or more of the abnormal physical signs—moderate tenderness, bruising, or swelling—in a patient under sixty-one years of age who injured his ankle while walking was a good indication that there was no major bony injury.

In the series of 111 patients studied there were forty-one patients in these three groups. It was suggested by the author that patients in

these groups do not require radiological examination for the determination of treatment; such cases could be treated by the general practitioner without reference to the hospital.

In the remaining patients clinical features gave only an inaccurate guide to the nature of the injury, and radiological examination would be necessary in such cases.

Psychologic Studies in Geriatric Hemiplegia

E. J. Lorenze, R. Cancro, M. A. Sokoloff (The Burke Foundation, Cornell University Medical College, White Plains, New York) J. Amer. Geriat. Soc., 9:39-47, January 1961

The authors investigated 119 older hemiplegic patients in order to determine whether visual perceptual defects significantly interfere with ambulation or the activities of daily living.

It is reported that there was no significant difference between right and left hemiplegia in terms of successful ambulation. The study suggests that patients with involvement of the dominant (right) hand may be expected to perform more satisfactorily in activities of daily living. There was no significant difference between males and females regarding success or failure in ambulation and ADL.

Of the 119 hemiplegics, thirty-five were studied for visual perceptual disturbances; only three of the thrity-five patients showed no defects in this respect. The most striking findings in seven cases of severe visual perceptual disturbance were: (1) that these patients failed particularly in the activities of daily living, and (2) the hemiplegia was on the left side. Apparently, patients with right-sided hemiplegia have better prospects for rehabilitation in ADL than do those with left sided hemiplegia.

The authors state that a technique is needed for evaluating the degree of visual perceptual dysfunction in psychologically untestable cases. The tests used in this study undoubtedly involved other intellectual factors besides visual perception. The more intellectually intact patients had fairly satisfactory language function and could co-operate in the examination procedure; thus, the data on these cases lent additional bias to the results.

Promontory Fractures of the Calcaneus

Jerome G. Finder (Department of Orthopedic Surgery, Michael Reese Hospital and Northwestern University Medical School, Chicago, Illinois) J. G. Hussussian and Bertram Levin, J. Int. Coll. Surgeons, 35:84-90, January 1961

The term promontory designates the most superior portion of the anterior aspect of the calcaneus where it articulates with and overlaps the cuboid. This portion of the calcaneus has also been referred to as anterior lip, anterior process, anterior superior portion, anterior portion, anterior superior process and anterior end. Fractures at this anatomic site frequently are overlooked and diagnosed an ankle sprain. Failure to recognize the existence and clinical significance of a fracture of the promontory of the calcaneus may lead to unnecessary complications and disability due to nonunion. This communication represents a report of sixteen fractures discovered over a period of twenty-six months at the Michael Reese Hospital. The authors' chief purpose is to recall the attention of the physician to the existence of this lesion, to point out the difficulties of diagnosis and to emphasize the need for adequate treatment.

Two mechanisms may produce a promontory fracture: avulsion or impaction. Avulsion occurs when the foot is suddenly thrust into a position of marked equinovarus by a severe force which avulses the beak of the promontory from the main body of the calcaneus. This type occurs more often in women, which is probably due to the hazard of high heels. In this instance the foot is already in a position of equinus.

The impaction mechanism also involves a sudden sharp force but the foot is in acute dorsiflexion at the time the force is applied.

The signs and symptoms of fracture of the promontory of the calcaneus are similar to those encountered in a sprain of the foot or ankle. The authors point out the need to differentiate these conditions by means of adequate diagnostic roentgenograms. The promontory is best visualized in a lateral oblique view with the foot held in equinovarus. In this view, the promontory of the calcaneus is projected clearly, without the overlapping shadows of the adjacent tarsal bones.

Treatment varies from unrestricted weight bearing to complete immobilization in a short leg case for eight weeks without weight bearing. The authors favor the more conservative type of protection and immobilize their patients in a short leg cast for six weeks. No weight bearing is permitted during this time. Following removal of the cast, ankle taping is utilized for one to two weeks with graduated weight bearing. Finally full weight bearing is allowed, and physical therapy is employed where indicated.

The neglected fracture resulting in a nonunion and causing pain and disability requires surgical treatment. The segment which has not united is resected. If this fails to give relief, a triple arthrodesis is indicated.

The authors closing comments include: (1) multiple roentgenograms may be necessary to adequately view the promontory of the calcaneus, (2) temptation to treat this type of fracture superficially should be avoided and (3) the prolonged disability consequent to inadequate care imposes a severe penalty on the patient and justifies conservative management.

Two case histories are presented demonstrating the disability caused by undiagnosed or improperly treated promontory fracture and the successful recovery of a properly treated lesion.

Nursing Care of the Child after Open Heart Surgery

Evelyn S. Craig and Sarah Pack (Indiana University Medical Center, Indianapolis), Amer. J. Nurs., 61: 78-80, February 1961

Some of the anxiety is lessened for the child who undergoes open heart surgery and for his family when they visit the cardiac unit preoperatively. An opportunity is provided to talk with the doctors and nurses, to see the equipment which will be used postoperatively, and to learn the deep breathing and coughing exercises.

At the Indiana University Medical Center Hospitals the child goes to the recovery room immediately after surgery. As the chest tubes are connected to water-seal suction bottles, the blood pressure cuff applied, the nasal oxygen and Levin tubes inserted, the nurse again explains to the child what is being done and what he may expect. Simultaneously, the surgeon is meeting with the parents and, during the child's stay in the recovery room, he frequently notifies them of the child's condition.

If the patient is so emotionally upset that he is uncontrollable, the parents visit him in the recovery room briefly to calm him. If his condition is critical, the parents and clergy may visit.

During this period, the nurse checks for vital signs at least every fifteen minutes, checks the patency of intravenous and drainage tubes, and turns the child at least every thirty minutes. If the polygraph machine accompanies the child to the recovery room, it measures and records blood pressure, oxygen and carbon dioxide blood levels, respiration, temperature, and electrocardiographic and electroencephalographic activity.

Following the anesthesiologist's examination of the patient, he writes a release permitting the patient to be moved to the intensive care unit. During the critical forty-eight hour postoperative period, the personnel in the intensive care unit continue checking vital signs, drainage tubes, chest expansion, and are alert to subcutaneous emphysema and early signs of congestive heart failure. Measures to reduce elevated body temperature, daily electrolyte analysis, and intake and output measurements are added to the nursing procedures in the early postoperative period. The intensive care personnel also provide the emotional support of patient and family during this critical period.

The authors concluded that the preoperative conference with patient and family does much to ensure closer co-operation with the complex treatment necessary during this early postoperative period as well as alleviating some of the anxiety of open heart surgery for children.

Follow-up Survey Study of a Group of Elderly Above-Knee Amputees

Burton J. Wolters (Detroit, Michigan), Arch. Phys. Med., 42:68-74, January 1961

Seventy-five above-knee amputees over fifty years of age were treated at Rehabilitation Institute of Metropolitan District between 1951 and 1959. Fifty-five were men and twenty were women. The majority was between fifty and sixty-five years of age at referral, while the oldest person was seventy-nine years.

Following evaluation fifteen patients (20 per cent) were advised against using a lower extremity prosthesis because of advanced disease in other parts of the body. At the time of the follow-up survey forty-four persons could be contacted of the sixty persons who had been fitted. Thirty-two persons were able to complete re-examination at the "follow-up clinic."

To evaluate the degree of rehabilitation achieved with the prosthesis, a modified Rusk classification was used. None of the patients was judged to be fully restored, or Class 1. Eight patients (25 per cent) had achieved partial restoration (Class 2), and an additional eight patients had achieved self-care plus (Class 3). The remaining 50 per cent were not wearing prostheses at all or only for extremely short periods of time. Thus, 50 per cent were considered to be deriving benefit from prostheses.

Statistical examination of the data showed little correlation between chronological age and degree of rehabilitation. Physiologic age of the amputee was repeatedly associated with the results, but this correlation was not quantitated. The quantity of training in the use of the prosthesis did not vary significantly between the group which succeeded and that which failed, but inconsistency in appearing for treatment and multiple complaints occurred much more frequently in the latter group.

The author concluded that chronological age should not be a determinant in fitting an amputee with a prosthesis but careful screening of individuals with generalized disease, psychologic problems, and advanced physiologic age should reduce rate of failure to achieve a good level of rehabilitation.

Age Features in the Reaction of the Organism to the Performance of Physical Exercises

N. N. Iakovlev, et al (Institute of Physical Culture, Leningrad, USSR), Sechenov Physiol. J. USSR, 46:970:978, December 1960

Investigation was made of age features in the reactions of 327 healthy adolescent, adult, middle-aged, and elderly subjects to a standard physical task and various athletic exercises, using repeated determination of body reactions to standard exercise (twenty knee bends in thirty seconds) and to various types of training tasks such as skiing, running, rowing. All exercises began with ten to fifteen minutes limbering up and lasted forty-five to sixty minutes. Slight differences appeared in the initial levels of functional and biochemical indices, except blood cholesterol, which rose with age. Hemodynamically, adolescents exhibited a greater increase of pulse rate, with less increase in systolic pressure and greater reduction of diastolic pressure than in adults. Intensified cardiac activity in adolescents, middle-aged and elderly persons depended more on increased rate than on increased strength of cardiac contractions. Greater increase in level of lactic acid in the blood of adolescents and elderly individuals appeared when work of the same intensity varied in duration and when work of the same duration differed in intensity, as compared with the other age groups. Oxygen consumption per unit of time per unit of body weight diminished with age. Poorer mobilization of intrinsic energy reserves in adolescents and those over forty was shown by smaller increases of blood sugar levels.

A feature common to all age groups was that engagement in light athletic exercises produced the greatest reaction in the cardiovascular system, the greatest increase of lactic acid in the blood, and led to increase of blood sugar and cholesterol. Engagement for four to six months in general physical training led in all age groups to some degree of improvement in the reactions to the standard work, but the degree of improvement diminished as age increased. The ability of the organism to adapt itself to increased muscular activity diminishes with age.

The Incidence of Head Injuries in Children

Johannes C. Melchior (Queen Louise's Children's Hosp., Copenhagen, Denmark), Acta Paediat., 50:47-50, January 1961

Only isolated numerical reports concerning the incidence of head injury in childhood are available and these are usually concerned with special categories of patients suffering neurological and/or psychiatric symptoms. In the evaluation of the importance of head injuries in neuropsychiatric patients, it is necessary to determine the incidence of head injury among children without any such symptoms.

Inquiries were made regarding head injury, headache, vomiting, vertigo, loss of consciousness, and treatment in 1,190 patients admitted to the hospital over a period of eight months. The presumption that head injury occurs more frequently among children with neurological or severe psychiatric conditions is based on several factors; actual conditions (head injury is genuinely more frequent in neurological and psychiatric cases than among children suffering from other conditions) and the fact that parents of neurologically involved children are more willing to answer questions regarding head injury positively than parents of children with other conditions. In previous studies head injuries predominated among boys, two to one, explained by the fact that boys are more aggressive than girls. The present material indicates that the incidence is identical in boys and girls. In patients admitted for treatment of neuropsychiatric conditions, the incidence of head injury was significantly greater as compared with the group of patients without neurological or psychiatric conditions.

The Importance of Size of Load, in Rate of Performance of and During Exercises and of the Intervals between Sessions in Relation to Effective Muscular Training

N. V. Zimkin (Leningrad, USSR), Sechenov Physiol. J. USSR, 46:1000-1012, December 1960

In the initial stages of training of individual muscles groups, the best effect was obtained when the weight of the load to be raised and the rate of the movements were not excessive and the intervals between training sessions were sufficiently long. After a month of training, the resistance to extreme heat (to the point of inability to continue work) was higher in individuals with no previous special training for work in high temperatures. Training for resistance to giddiness by exercises involving rapid movements of the head, tested with different intervals between sessions, was more effective with longer intervals. Increase of non-specific resistance to unfavorable environmental conditions was seen to be greater with moderate than with large muscular loads. Muscular training gave good results only within the limits of a certain range of exercises, the range being determined by the weight of the load to be lifted, the rate of the movements, the duration of the exercises, and the length of the intervals between sessions. In forced training and in the presence of great emotional stress non-specific resistance, certain vegetative functions, and poorly trained motor habits could be affected adversely before there was any deterioration in the individual's athletic achievements.

In the initial stages of training, increase of the physiological tension of training did not always lead to increased effectiveness in the development of strength. Increase of tension could only promote increase of effectiveness later as the adaptability of athletes to training increased. Likewise, speed of movements in initial stages of training were not always increased in proportion to the intensity of the physical exercises performed. Development of strength, speed, and endurance in muscular exercises was most effective when excessive physiological strains were not produced in the course of training by the use of particular loads, rates of movements, and intervals between sessions.

Trauma, Surgery, and Circulation of the Talus—What are the Risks of Avascular Necrosis?

R. L. Larson, C. F. Sullivan, and J. M. Janes (Mayo Clinic, Rochester, Minn.), J. Trauma, 1:13-21, January 1961

The frequent occurrence of avascular necrosis of the talus following injury has given rise to the concept that talar blood supply is poor or inadequate. Better injection technics have clarified the vascular anatomy of the talus. Contrary to the older concepts, recent work indicates an adequate blood supply. The extra-osseous circulation is via three main arteries of the cartilage-free surfaces, and via two discrete vessels: the artery of the tarsal sinus and the artery of the tarsal canal. The major part of the blood supply to the body of the talus enters anteroinferiorly through the neck of the talus. The head is supplied by vessels entering from the superior surface of the neck and inferolateral aspect of the neck which faces the tarsal sinus.

The purpose of the study of x-rays of 242 patients who had undergone talar surgery and x-rays of patients with talar fractures was to determine the incidence of avascular necrosis following triple arthrodesis, Lambrinudi arthrodesis, and the Grice procedure, since all three interrupt the arteries of the tarsal canal and tarsal sinus. An attempt was made to correlate the type of surgical procedure or fracture with the appearance of avascular necrosis. Necrosis developed in 6.2% of the operative cases, with the body involved in every instance and the neck in five cases.

Evidence of avascular necrosis appeared in eleven x-rays of fractures. It is difficult to predict whether or not the talus will undergo necrosis after fracture. The original x-rays after injury do not indicate the position of the fragments at the moment of impact. Avascular necrosis does not develop with any regularity following arthrodesis, because in most patients the blood supply from the periosteal vascular network is adequate. The seriousness of trauma to the talus can be appreciated when it is realized that the talus is without muscular attachment, that three fifths of the surface is articular cartilage, that the outstretched neck is quite vulnerable to injury, and that its blood supply often is disrupted internally due to comminution as well as externally by rupture of ligaments.

Two circumstances contribute to the decreased incidence of avascular necrosis subsequent to arthrodesis as compared to that after injury: (1) there is no disruption of the intra-osseous blood supply during operation, and (2) during arthrodesis the cancellous bone of the talus is exposed and approximated to the adjacent bones, allowing easier vascularization after operation.

Deformities of the Forearm

Lee Ramsay Straub (Hospital for Special Surgery, New York, New York), Bull. Hosp. Special Surg., 3:10-24, November 1960

Congenital absence or partial absence of either the radius or the ulna produces severe functional and cosmetic disability. Terms were selected from an exhaustive study of nomenclature to describe congenital anomalies. Bunnell felt these deformities arise according to rays, or on a segmental or on an annular basis. Bardine and Lewis consider the origin of deformity according to a chronological development pro-

gram. The strongest factors in etiology are considered to be genetic, most of which arise as a mutation that may be inherited as a qualified Mendelian dominant characteristic. A very careful family history may reveal deformities, although people are often unwilling to reveal deformities in relatives. It appears likely that many inflammatory and accident occurences in fetal life account for deformities which cannot be attributed to a genetic basis. There have been frequent reports of associated anomalies, both skeletal and visceral, with forearm deformity.

In eleven cases of congenital absence or partial absence of the radius, transfer of the proximal fibular epiphysis to the forearm was performed, followed by growth in the transferred epiphysis in two patients operated under the age of six months. Osteotomy with carpal resection for correction of clubhand was also done.

Congenital absence of the ulna is less common. The "one bone forearm" procedure for partial ulnar absence has provided excellent continued correction of deformity and improvement in both hand and elbow function, providing utilization of the growth potential of the distal radial epiphysis.

On The Prognosis of Rheumatoid Arthritis

Eric Jonsson (The Medical Department III, Sodersjukhuset, South Hospital, Stockholm, Sweden), Acta Orthop. Scand., 30:2, 113-123, 1960

Very little is known of the natural course of this disease and very few long-term studies have been made. A major problem in such studies arises from the fact that present diagnostic methods and criteria are insufficient. For example, it is reported that the "Criteria Committee" of the American Rheumatism Association was shocked to discover that "30 percent of cases that might be called definite rheumatoid arthritis by one or another physician did not meet the set of criteria that the committee was able to establish." Criteria for assessing the course of the disease include clinical and laboratory observations; which are usually divided into two categories: those which are thought to reflect the degree of activity of the disease, such as signs of joint inflammation and sedimentation rate; and those which indicate the functional capacity of the patient, such as range of joint motion and strength of grip. Data from one or both categories have been used to measure remission or exacerbation in the course of the disease. Too little is known, however, about the relationships between these findings and the important influence of observer error resulting from failure to assess adequately the patient's psychic reaction and the influence of the examiner's personality.

It is important that the same doctor examine the patient and follow the patient's progress for a very long time if data is to be useful. Cases with insidious onset, those in which there is a persistently high sedimentation rate, marked muscular atrophy, abundant subcutaneous nodules, or symmetry of joint symptoms have been observed by the author to have a tendency to poorer prognosis than those not presenting these features. Contrary opinions and observations have, however, been made by other observers. The difficulty of assessing the effectiveness of any therapeutic measure is further complicated by the well known but unpredictable pattern of exacerbations and remissions.

A New Method For Assessment of the Static and Dynamic Weight-Bearing of the Foot. Dynamic Weight-Bearing of the Foot

H. Wetzenstein (Orthopaedic Clinic, Karolinska Institutet, Stockholm, Sweden), Acta Orthop. Scand., 30: 91-100, 1960

In judging the weight-bearing of the foot, investigators have been limited either to purely subjective impressions, or to the use of complex methods of measurement not suited to ordinary clinical use. The author has attempted to develop a technically simple measuring apparatus for objective registration of the foot's weight-bearing on standing and walking in shoes. A stiff spring balance device is inserted in the heel of the shoe. It consists of a plate, carried by three cantilevers. On each cantilever are mounted two strain-gauges, one on the upper and one on the lower side. Deflection of the cantilevers by the load borne on the heel influences the strain-gauges, which record by means of mirror galvanometers. The total vertical load, and the transference of the load in the anterior posterior direction as well as the lateral-medial direction are calculated at nine evenly spaced intervals during the stance phase. The migration of the point of action of the load over the weight-bearing surface may thus be objectively studied. Measurements are taken with the subject walking on a treadmill at a speed of 116 steps per minute. Weight-bearing on the heel was seen to last from five- to seven-tenths of a second at this rate. Preliminary studies show that varus feet take more weight on the lateral side and valgus feet more on the medial side. Further studies are planned to show whether such alterations in migration of weight are sufficiently significant to allow a demarcation of different weight-bearing types.

Economic Analysis of Medical Care in the United States

Charlotte Muller (School of Public Health & Administrative Medicine, Columbia University, New York, New York), Amer. J. Public Health, 51:31-42, January 1961

The source of income for all consumption purposes, including health, is the use of resources by the productive system of the whole country. In 1958 the Gross National Product divided into $24 for personal services including medical care, and $11 for government purchases of services. In the health field, the government share of the total is about 25 percent. Sources of gross national product, gross sales, and personal income are analysed. Sixty-one percent of the nation's households earned below $6,000, and 14 percent were under $2,000. This is important when selecting a logical premium for health insurance. Private expenditures on medical care are a small part of disposable income ($88 per capita in 1957). Increase in total consumer expenditure on medical care reflects increase in population and in medical care prices. Insurance accounted for half of the expenditures for hospital and 30 percent for physician's care. Hospital prices have risen because of the rising cost of providing service and more complex care demanded, greater access to hospitals, and increased population.

The scale of medical solvency, classifying the population on the basis of ability to meet medical needs out of personal income, finds the insured population higher. Differ-

ences in medical care spending are associated with age, sex, region of residence, size of community, and income, and the basic elements of need, economic capacity, opportunity, attitudes, and information. As family size increases, expenditure increases only if income is above the adequacy level. Below that level medical expenditure declines because of increased food expenses. The income of the aged is low, but their need is so great that their expenditures are higher per capita than those of the rest of the population. Tax deductibilty has given impetus to health insurance subsidized by the employer. Attitudes toward government services vary with national culture and socioeconomic background. Many are suspicious of the quality of free services. Physician-patient relations have been modified by third-party payments and fee schedules. The government, in effect, subsidizes the voluntary system through tax allowances for donations, employer contributions to health insurance, and personal medical expense, including premiums. Medical care benefits are found in parts of the social security system.

What the public expects in medical and hospital care is a composite of persistent and powerful changes in the underlying natural sciences and related technics, of the higher demands for comfort and personal social status identified with receipt of modern medical attention, and of improved knowledge of what is available and what is effective. Medical care is recognized as a safeguard to productivity by shortening costly spells of disability. In terms of flow of income and creation of employment, the nation is dependent upon a demand for services of all kind.

Electrophysiological Data on Some Mechanisms for the Overcoming of Fatigue

E. K. Zhukov and Iu. Z. Zakhar'iants (Institute of Physical Culture, Leningrad, USSR), *Sechenov Physiol. J. USSR*, 46:955-963, December 1960

Objective and subjective findings showed that fatigue developed in untrained individuals one and a half to two minutes after supporting or raising and lowering a 10 kg. weight. Excitation was seen to irradiate to muscle groups having no direct bearing on the work being performed. In some cases, the excitation also spread to antagonist muscles, which created an additional load. In the dynamic work a change indicative of disturbance in the concentration of muscular effort was seen in the innervation pattern. All these signs pointed to commencing inco-ordination of the activity of the motor apparatus. Respiration became interrupted and irregular; in the case of dynamic work, there was disturbance of the co-ordination between respiratory movements and the repeated raising of the weight. It became difficult to perform, the arm "was breaking," and there was a longing to let the weight go. In individuals in this state, work could continue at the former high level by making a great effort.

A considerable but variable period elapsed after the appearance of signs of fatigue before it actually became impossible to perform the work, and gravity irresistibly extended the arm. The widely prevalent definition of fatigue as a reduction in the working capacity as a result of work is not accurate. Fatigue can be present without reduction in work (without reduction in functional capacity). Disturbance of the co-ordination of functions shoud be regarded as the main index of fatigue. Electromyographic findings show that there was increase in the amplitude of action potentials of the muscles, some reduction in their frequency, increase of the summated electrical activity, and the development of regularity in rhythm of potentials as fatigue developed. Increase of the summated electrical activity results most probably because of involvement of fresh neuromotor units. Increased regularity in rhythm of the potentials results from synchronization of the activity of neuromotor units. The constant bringing of new neuromotor units into activity and the synchronization of their activity constitute one of the physiological mechanisms for the overcoming of fatigue. Afferent signs from mechanoreceptors in the muscles and joints and from the organs of vision apparently constitute the essential exciting factor for the processes of mobilization and synchronization.

Electromyograms show that electrical activity of muscle was increased during the period of development of fatigue. During the phase of complete exhaustion, muscle potentials declined sharply, became less frequent, and were desynchronized. These facts indicate that fatigue may depend primarily on changes occurring in the muscle itself. Distinguishing between the phase of overcoming fatigue and the phase of complete exhaustion is essential both in the analysis of the functional shifts arising in the human body in connection with the development of fatigue and in the practical evaluation of the degree of fatigue.

The Myopathies

Victor Dubowitz (Institute of Neurology, Queens Square, London), Physiotherapy, 46:341-349, December 1960

The term "myopathy" simply means a disease of muscle. However, it is usually restricted to those conditions where the muscle is primarily affected and excludes the muscle atrophies secondary to disease of the nervous system.

In general, the myopathies may be divided into two groups; those which are inherited and those which are acquired. The infantile hypotonias are listed separately because they differ in many respects from the other myopathies and the metabolic myopathies are listed separately as they are due to an enzymic defect in the breakdown of muscle glycogen.

In the inherited group, progressive muscular dystrophy is characterized by a progressive weakness and wasting of various muscle groups. The dystrophy is extremely variable in its presentation; however, there are some well-defined patterns of the disease which are fairly consistent.

The author describes the various varieties of progressive muscular dystrophy which include Duchenne's, facioscapulohumeral, and limb-girdle.

In all the forms of dystrophy, the proximal limb muscles are involved before the distal ones and the muscles of the hands and feet are not affected until late in the disease.

In the second type of inherited myopathies, the myotonic syndromes, the main feature is an inability to relax the muscles. One form starts in childhood and is called myotonia congenita. The other variety, myotonic dystrophy, usually starts in adolescence or later.

The acquired myopathies form a large and variable group. The author classifies them into three main catagories: (1) inflammatory, which results from parasitic infections, polymyositis and those which occur in conjunction with collagen diseases such as rheumatoid arthritis; (2)

caricinomatous, which develops in association with carcinoma of the lungs, stomach, breast or other sites; (3) endocrine, which occurs with thyrotoxicosis, myxedema and Cushing's syndrome. In the acquired myopathies, the weakness again often tends to be proximal rather than distal.

The author discusses in detail the clinical pathological features and some of the general principles in the management of the Duchenne type of progressive muscular dystrophy.

Surgical Treatment of Rheumatoid Hand

Edward D. Henderson and Paul R. Lipscomb (Mayo Clinic & Mayo Foundation, Rochester, Minnesota), J.A.M.A., 175;431-440, February 11, 1961

Many of the surgical techniques for reconstruction of hands after trauma may be useful in restoring function to hands crippled by rheumatoid arthritis.

Candidates for reconstructive surgery must be carefully selected. It should be limited to patients who are actively interested in restraining lost function to their hands and in whom pain, deformity and dysfunction are increasing in spite of conservative measures.

The authors discuss some of the pathological conditions encountered and present certain specific surgical procedures which have been of value in correcting deformities of the rheumatoid hand.

Tenosynovitis may affect any tendon sheaths but it most commonly affects the sheaths of the wrist and finger flexor tendons and the sheath of the flexor pollicis longus tendon. If conservative measures fail to control the symptoms, prophylactic excision of the tendon sheaths may be performed.

Carpal Tunnel Syndrome may result in paresthesia accompanied by hypesthesia along the distribution of the median nerve and atrophy of the thenar muscles. If the condition does not respond to corticosteroid injections, surgical incision of the transverse carpal ligament will provide relief by releasing the median nerve from compression.

Spontaneous rupture of the flexor pollicis longus tendon may result from tenosynovitis. The surgical procedure may consist of removing the part of the tendon and reinserting it distally or using a tendon graft of the palmaris longus or plantaris longus tendon.

Contracture of the intrinsic muscles, including the lumbricalis and the interosseus muscles, may be corrected by removing a segment of the oblique fibers of the extensor aponeurosis in a triangular fashion so that only the transverse fibers of the extensor aponeurosis are acted on by the interosseus and lumbricalis muscles.

Ulnar deviation of the fingers impairs the function of the interosseus muscles and decreases the pinch between the thumb and the tips of the fingers. It is advisable to surgically correct this even before the active rheumatoid process has subsided. In the stage characterized by synovitis of the metacarpophalangeal joint a complete synovectomy of the joint is performed and the central slip of the extensor hood is brought back to midline of the joint.

Reconstructive operations in which movement at the joint is retained are usually not successful for deformed, unstable, or painful interphalangial joints of the fingers and thumb. If there is reasonably good stability and function at the proximal joint of a finger, arthrodesis of either of the distal joints may eliminate pain and correct a deformity which interferes with function.

For optimal function of the hand the wrist must be dorsiflexed to 30° to 45°. Therefore, a flexion deformity of the wrist should be corrected prior to surgical treatment of the hand itself. A dorsal wedge osteotomy of the distal end of the radius or arthrodesis of the wrist in the functional position will correct a wrist flexion deformity.

Follow-up Survey of Clubfoot

G. Dean MacEwen, Daniel J. Scott, Jr. and A. R. Shands, Jr. (Alfred I. Du Pont Institute, Wilmington, Del.), J.A.M.A., 175:427-430, February 11, 1961

The results of treatment in cases of clubfoot have been observed in 149 patients treated in a single institution during the past twenty years.

The authors believed that a significant follow-up study should include only those patients whose treatments had started at least five years before. Therefore, all children under five years of age were excluded from the study leaving 109 patients. Sixty-two of these patients returned for follow-up examination with a total of ninety-six cases of clubfoot. Some patients had bilateral club feet.

The feet were evaluated under two headings, clinical evaluation and roentgenologic evaluation. Clinical and roentgenologic evaluation were rated as excellent, good, fair, and unacceptable.

The nineteen patients over fifteen years of age had a considerable variation in treatment which included repeated manipulations, and plaster casts followed by Dennis Browne splints in their infancy.

In the patients under fifteen years of age, the treatment had been patterned almost exclusively after the Kite multiple casts technique. Thirty-two surgical procedures were performed on the ninety-six feet. These consisted of lengthening of the Achilles tendon and posterior capsulotomy in thirteen; lateral transfer of the anterior tibial tendon in seven; medial release in one; derotation of the tibia in one; and triple arthrodesis in ten.

The study led to the conclusion that in 71.9 percent of patients of clubfoot experienced excellent or good results with plaster treatment and supplementary soft tissue surgery, even though three or four series of plaster casts might be necessary. It was shown that plaster treatment in children over seven years of age could be beneficial, and that manipulations may cause epiphyseal separations followed by growth disturbances.

The recurrence rate seemed to be much less when night splints were used following the removal of casts. It was, however, shown conclusively that night splints could not materially improve a recurrence or residual deformity in the older child.

Ultrasound Therapy of Plantar Warts

R. J. Rowe and J. M. Gray (Marshfield Clinic, Marshfield, Wisconsin), Arch. of Dermatology, 82. 210-211, December 1960

The authors report their observations of twenty-five patients with a diagnosis of plantar warts of one month to fifteen years duration. The warts were treated with ultrasound for fifteen minutes using an energy output of 0.6 watts per square centimeter, a mineral oil coupling agent and a rotary motion of the sound-

head. This procedure was repeated at weekly intervals for periods varying from two weeks to over fifteen weeks. In twenty-two patients the foot either appeared normal at the site of the previous wart or the wart was small, dry and so superficial that it was no longer a problem. Three patients were listed as having warts still present. One of these patients discontinued the treatment, one reported that the warts were no longer painful and the third will continue treatment to a total of at least twenty.

Physical Medicine in Rehabilitation for Arthritis in Children

Miland E. Knapp (Director of Physical Medicine and Rehabilitation, Elizabeth Kenny Institute, Minneapolis, Minesota), J.A.M.A., 174: 1951-1953, December 10, 1960

Certain properties peculiar to children necessitate special attention in cases of rheumatoid and infectious types of arthritis. One of these properties is growth which occurs at the ends of long bones close to the joints. Among the more important factors which influence growth are circulatory changes, use or disuse, and the presence of contractures. Chronic inflammation in arthritis may cause overgrowth at the epiphyseal lines due to the increased blood supply to the part. The opposite effect may be produced by immobilization or disuse, and contractures. Children are active by nature and normally maintain range of motion when they are not limited by pain or some other disturbing factor. Controlling the child may be extremely difficult in cases of a developing deformity which requires rest or inactivity.

Every effort must be made to create a realistic and hopeful attitude in the parents so that they will continue treatment of the child over the years that are required.

The objectives of physical treatment in the child are the same as in the adult, the most important being the relief of pain and to enhance the functional ability of the patient. Restriction of motion may be necessary in some cases; however, this should be done only with careful consideration of the possible bad effects which may be produced.

Moist heat is one of the most efficient methods of pain relief and this can be given in the home by the child's mother.

The second objective of physical treatment, prevention or relief of contractures, may be accomplished by correct positioning in bed, exercises for range of motion and muscle strengthening. Home treatment programs, if carried out in detail, provide the best and most available therapy for the children because of the prolonged periods involved.

Correction of Spastic Equinovarus Deformity in Elderly Hemiplegics by Tenotomies

Amnon Fried (Beilinson Medical Center of Kupath-Holim, Petah-Tiquah, Tel-Aviv, Israel), Acta Orthop. Scand., 30:149-154, 1960

A spastic equinovarus deformity frequently results from hemiplegia following cerebral vascular accident. Walking is increasingly hampered as the deformity develops with the recovery of muscle tonus during the first six to twelve months after onset. It is most pronounced during swing phase and often nearly disappears during stance. Callouses develop on the lateral border of the foot and a faulty step mechanism results, with the foot stepping first on the outer toes, later bending into dorsal flexion and finally allowing the heel to contact the floor. In severe cases heel contact may be completely lost.

Various splints may provide an effective means of control when spasticity is not strong. Many elderly patients, however, resist use of a brace. If spasticity is strong, the splint may pull the lower leg forward, producing knee flexion during stance.

Surgical release of the spastic muscles has been found effective in eight cases treated by the author. Under local anesthesia, through an incision posterior to the medial malleolus, the tendons of the tibialis posterior and flexor digitorium longus are sectioned and a one-inch piece is removed from each. If excess tension persists the Achilles tendon is lengthened. Following the skin closure a light below-knee walking cast is applied. No heel is used on the cast and the day after surgery the patient is encouraged to walk bearing weight on the sole of the plaster. The patient is discharged after two to four days, and the plaster is removed in about three weeks. Elastic bandages are then used as long as swelling is present.

Abstracters for July

We are indebted to the following Association members for the carefully prepared abstracts that appear in this issue:

Aida Sanchez	Nanette Keegan
Rachel Adams	Joan Erback
Geraldine Midgley	Nancy Watts
Miriam Partridge	Mary J. Hayes

Proprioceptive Neuromuscular Facilitation Film

A 35 minute color film with sound is available to chapters and schools of physical therapy at a rental fee of $10.00. One copy of the film has been given to the Association by the California Rehabilitation Center. Requests from states east of the Mississippi should be directed to the American Physical Therapy Association, 1790 Broadway, New York 19, New York; rental is payable to the American Physical Therapy Association. Those west of the Mississippi should write to California Rehabilitation Center, 2600 Alameda, Vallejo, California; rental is payable to the California Rehabilitation Center. All requests should be submitted four weeks in advance of date of showing. Alternate dates are desirable since both copies may have prior bookings.

Book Reviews

Book of Bodily Exercise. *By Christobal Mendez, M.D. Translated by Dr. Francisco Guerra, research associate of the History of Medicine Department of the Yale University School of Medicine; edited by Frederick G. Kilgour, Librarian of the Yale Medical Library. Cloth, 122 pp. New Haven: Elizabeth Licht, 1960. $10.00.*

This book is of doubtful value to one interested in a scientific theory of exercise. It is, however, a fascinating glimpse into the past; a journal of observations and anecdotes compiled by a physician in Seville in 1553. Its importance lies in the historical fact that it is the first printed book by a physician about exercise.

Little is known about Christobal Mendez. His obscurity is the best evidence that he was not an outstanding physician and the rarity of his book demonstrates he was not a widely read author. However, one cannot deny his earnest concern for the preservation of health, and one is impressed with his vital view of life which allows him to cut across the whole spectrum of human values. Because of the intensity and scope of his viewpoint and the haste in his writing, the material seems disorganized, sometimes illogical. It is sprinkled liberally with unfounded conclusions and frequently brightened by delightful episodes from the life of a physician in the first half of the sixteenth century.

By his own word Mendez was persuaded to write the book on exercise, "to show all its great benefits and wherein I bring everything that can be said about it, as well as several other things not improper to this purpose that are worth knowing and helpful."

The book is divided into four parts. The first treatise deals with exercise and its benefits, its freedom from difficulties and the purpose of its invention. Twelve chapters are dedicated to the preservation and restoration of health. The second treatise concerns the division of exercise into the particular areas of the senses (eyes, ears, sense of smell, animal virtues, cogitation and memory). A chapter on exercises designed to better the health of women is included along with a special thesis on the values of walking, "the most beneficial of all particular exercises." The third treatise explores the area of common exercise with particular emphasis and analysis of ball playing as the most complete exercise of the common type. Other chapters suggest exercises required to preserve the health at various age levels and suitable in the treatment of some diseases. The fourth treatise deals with the time when exercise should be employed. The discussion includes time of day, time of year and time of life with consideration for care of the body following the exercise period. The work is concluded with examples of exercises, activities for those who are lame or have weakness in some body part. It is curious to note a mention of massage to the uninvolved areas and a warning against too much exercise.

The translation is smooth and flowing. The type face is easily read and the quality of paper is good. There are two title pages each of which is reproduced in actual size and color, from one of the three known copies. This particular reproduction was taken from the copy in the Yale Medical Library.

From an historical literary point of view this book will be of interest to a wide audience particularly those who enjoy exploring the thinking, the writing, the activities, the arts and the philosophy of another era.

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Baby Talk. *By Morris Val Jones, Ph.D., Specialist in Speech and Hearing, School for Cerebral Palsied Children, San Francisco, California. Cloth, illus., 96 pp. Springfield, Illinois: Charles C Thomas, 1960. $4.50.*

This is a practical, usable book by a speech therapist broadly experienced in public school, college, and private clinic speech correction. He has had special success in helping parents of speech defective children to understand and co-operate in programs of therapy.

The book is essentially a parents' manual for home use in helping children to correct the immature speech habits usually known as "baby talk." Professional personnel in other fields having some responsibility for speech defective children and/or their parents should find the book most serviceable for reference.

The author states clearly that improvement of any form of inadequate speech is a complex and often difficult process which should have the best professional help. But where professional help is not obtainable, it is Dr. Jones' view that parents should themselves try to help their children, since "no one can tell which children will outgrow their baby talk and which will not." And even when trained professional help can be obtained, the author stresses that for optimum results the child requires much speech help at home.

Brief as it is, the book defines and describes the problem and possible causation; offers means and methods for checking the child's speech; makes suggestions for seeking and utilizing clinical help; discusses materials and procedures for use in working with the child at home; and provides questions, quizzes, and practical advice by which parents may guide and evaluate their own efforts.

The book is well printed, and easy to handle; but in this reviewer's opinion the glossy paper will have a serious disadvantage, reducing ease of reading by glare from reflected light. Photographs of clinical speech situations are sparingly used as illustrations. Bibliography is scattered through the text in quoting other authors, but the book lacks a master bibliography for convenient reference.

Users of this book will find Dr. Jones' approach authoritative, sympathetic, and optimistic, as well as interesting. He reveals a competent grasp of modern psychological practice in child guidance. The book is a useful addition to the author's earlier *Speech Correction at Home.*

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Clinical Orthopedics, No. 17. *Anthony F. DePalma, M.D., Editor-in-Chief. With the Assistance of the Associate Editors, The Board of Advisory Editors and the Board of Corresponding Editors. Cloth, illus., 387 pp. Philadelphia: J. B. Lippincott Company, 1960. $7.50.*

This volume is the seventeenth in a series of publications produced under the aupices of the Association of Bone and Joint Surgeons. The entire series is designed for the publication of original articles offering significant contributions to the field of orthopedics. This particular number represents articles dealing with the problems of physiology and pathology of bone in animals and man. The authors of the thirty-six articles are either associates, collaborators, correspondents or pupils of Franklin C. McLean, to whom the publication of this issue is part of a seventy-second birthday celebration.

The major portion of the book deals in detail with profound, highly technical articles on the chemical structure, the physiology and the pathology of bone, which information is obtained by the newer methods of electronmicroscopy, x-ray diffraction, and microinterferometry. The chemical nature of bone salts is reported from radioisotopic studies. Moreover, by means of isotopes, a variance in absorption is shown in patients with osteoporosis, Paget's disease, and tumor myeloma, from subjects with no skeletal abnormalities.

The last few chapters discuss clinical aspects of orthopedics, such as response to ACTH in crippled children, improved x-ray technique for hip fractures, intertrochanteric fractures and the Stone operation for hallux valgus. These together with special case reports are more easily comprehended by the reader.

Those in physical medicine doing research primarily on bone may find this book of value as a reference book. Not only does it explain the difficult concepts of bone physiology and pathogenesis, such as osteogenesis, osteomalacia, osteoporosi, and calcium deficiency, but it also describes the newer laboratory methods and techniques of cellular and molecular study. These latter features are helpful to the researcher, as are, indeed, a good set of illustrations and bibliography with which each chapter is provided.

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Disc Lesions and Other Intervertebral Derangements. *By E. J. Crisp. M.D. (Cantab.), D. Phys. Med. (Lond.), Consultant Physician Emeritus in Physical Medicine, Guy's Hospital, London. Cloth, illus., 158 pp. Baltimore: The Williams & Wilkins Company, 1960. $3.75.*

There is little new material in this short manual on disc lesions. However, because it presents another point of view, it throws more light on the complex subject of back pain and its treatment. Dr. Crisp writes with clarity and simplicity from a background of experience in general practice and later as specialist in orthopedics and physical medicine. A year's leave of absence for concentrated study, included work with Dr. Joel Gothwaite in this country to further the author's knowledge of body mechanics, and also observation of manipulative techniques by those "qualified and unqualified."

Part I comprises a review of the anatomy, physiology, and mechanics of the vertebral column from the viewpoint of the practitioner: what are the spots in which trouble is likely to occur, either congenitally or through faulty body mechanics in youth or through the wear and tear of the aging process? Attention is given the normal function of the disc and the changes that occur in the growth cycle, as well as pathological change. Dr. Crisp is of the opinion that the term "disc lesion," as was true of "slipped disc," is a misnomer. He states that the majority of persons beyond forty-five years of age, technically, could be said to have disc lesion without any history of pain or disability.

To those in pain, thorough clinical examination is in order. In Part II which composes the major portion of the text, the doctor analyzes subjective and objective findings leading to diagnosis, differentiating the problem disc from synovial impingement, strained ligament, malformation or malfunction, acute or chronic. His remarkable survey focuses attention first on lumbar and pelvic region, and progresses in succeeding chapters to dorsal and cervical areas. Another look is given to the articulations peculiar to each region, and the complications that arise and treatment advocated are then pursued.

There are a few well-chosen X-ray reproductions and black and white photographs, and a number of excellent line drawings illustrating anatomical structure and treatment techniques. References are listed at the end of each chapter.

The doctor's approach to treatment is conservative, he claims no panaceas. He states the effectiveness of judicious use of traction and manipulation, and, alternately the abuse and dangers of misapplication. He recommends other conservative measures where necessary, as bed rest, plaster immobilization, and correct corseting, and reports the value of such physical therapeutic measures as short wave diathermy, massage, and instruction in proper posture and body mechanics.

His techniques of traction and manipulation are described and illustrated in Part III. Both manual and mechanical traction are utilized, and for the latter the author designed a divided traction table which is pictured.

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Prosthetic Principles: Above Knee Amputations. *By Miles H. Anderson, Ed.D., Director; John J. Bray, C.P., C.O., Associate Research Prosthetist; Charles A. Hennessy, C.P., C.O. Associate Director, Prosthetics Education Project, School of Medicine, University of California, Los Angeles. Edited by Raymond E. Sollars, Associate Director. Cloth, illus., 331 pp. Springfield, Illinois: Charles C. Thomas, 1959. $10.00.*

Those who are acquainted with the above knee prosthesis teaching manuals used in the U.C.L.A. prosthetics courses will find in this book the same clarity of presentation and some of the same material.

The book was written as a teaching text and a practical reference for the prosthetist. It thus contains complete instructions for the construction of the above knee prosthesis, from first measurements to final fitting. Each step is well illustrated. In the final pages the Hydra-Cadence prosthesis is described.

As necessary background for the prosthetist the functional anatomy of the hip, thigh, and knee is presented. This is done in a simple way and begins with anatomical terminology. The following section is on locomotion and is a summary of the now well-known and excellent locomotion research carried out at the University of California.

Although the book contains the details of above knee prosthesis fitting and fabrication and is thus of primary use to the prosthetist, physical therapists who feel the need for detailed information on fit and alignment will find the book a useful reference.

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Medical Physiology and Biophysics. Ed. 18. *Edited by Theodore C. Ruch, Ph.D., Professor and Executive Officer, Department of Physiology and Biophysics, University of Washington, School of Medicine; and John F. Fulton, M.D., Late Sterling Professor of the History of Medicine, Yale University School of Medicine. Cloth, illus., 1232 pp. Philadelphia: W. B. Saunders Company, 1960. $16.00.*

This text has been a significant force in medical education for nearly three quarters of a century and has taken on a new title intended to indicate the author's conviction that the depth of the subject should be recognized. For many years physiologists have shuddered at the subject matter that was mistakenly called physiology. In this age of electronics and physics, we can no longer deny the value of physics, physical chemistry, and mathematics in the accurate measurements of human function.

In no way is clinical physiology slighted in this edition. On the contrary, careful consideration has been given to the question: "Does physiology illuminate the pathologic state or, conversely, does the abnormal function point up the normal physiology?" The space devoted to clinical physiology has been increased here, but still, as Dr. Ruch states, "..... there is not sufficient space to treat the subject completely or even systematically".

One of the features of all the editions of this text has been the presentation of studies from numerous laboratories of a consistently high caliber. Many of the chapters in this edition have been re-written and revised by geographically related workers. Extensive editing has been done for expression and content. The chapters that have undergone extensive revision are: nerve, muscle, reflexes and motor systems of the brain, blood, hemodynamics, cardiac cycle, electrocardiogram and the control of cardiac output, and most of the sections on respiration. Three excellent chapters have been dropped from this edition since their subject matter has largely passed into the realm of biochemistry. It is interesting to note that two chapters have been added which are actually at opposite ends of the academic spectrum; The Biophysics of the Cell Membrane, and The Neurophysiology of Emotion and Motivation.

Each chapter starts with a compact outline of the content. This is new in this edition and is of help to the student, since it is generally agreed that a very wise way to approach any subject matter is to take an over-all look at the entire topic before you attempt to digest the parts in detail. For the convenience of the reader, the authors have presented schematic diagrams to add to the understanding of some difficult topics. Examples of this can be found in Figure 65 which depicts the five sites of injury in diseases of motor units, and Figure 87 which shows the differences between the monosynaptic and multisynaptic reflex arcs.

This is a much improved edition and does accomplish the objectives set down in the preface. It should prove to be an even more satisfying reference for the medical student than the past editions. Even though the scope is broader, that is, reaching from cellular physiology to clinical physiology and medicine, nothing has been sacrificed that should not rightly have been left to periodic literature, or to other disciplines. This refining of content has added a great deal to the readability of this book.

Persons in the field of physical medicine would find this reference of interest particularly for its broad and clear interpretations of the recent advances in the field of nerve-muscle physiology. Neuromuscular and central nervous system physiology occupies 450 of the 1,179 pages. There is much of interest here, such as the chapter on clinical correlations: motor unit disease in which the usual misuse of the terms fibrillation and fasciculation was treated completely. The chapter on reflex regulation of movement and posture has been developed considerably as a result of the abundance of literature coming from numerous laboratories as a product of the newer methods of single nerve recording. There has been more detail of function added to explain the intricate relationship of the alpha and gamma motor systems. Again the University of California studies of human locomotion as related to the design of artificial limbs, is included in the section on muscle.

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Introduction to Medical Physics. *J. Trygve Jensen, Ed.D., Professor of Chemistry and Chairman of the Department, Wagner College, New York; Lecturer in Physics for Nurses, Teachers College, Columbia University, New York. Paper, illus., 240 pp. Philadelphia: J. B. Lippincott Company, 1960. $2.90.*

Dr. Jensen, as Lecturer in Physics for Nurses, has written this book to answer the many questions brought up each year in his classes. These questions are from the registered nurses who were completing the work for the bachelor's degree at Teachers College, Columbia University.

He hopes the book will be useful in nursing schools, not only as a text in physics courses, but also as a resource book in other courses where physical principles are involved. Students in related courses such as physical therapy, X-ray and the biological sciences should find it useful.

The emphasis in this book is on the basic principles of physics as related to the field of nursing. Dr. Jensen hopes that by answering *why* instead of only *how* the nurses may be better able to give nursing care of genuinely professional quality.

The subject matter covered is the same as in any general physics book. He does spend more time in explaining the scientific method than is usually found, in fact devoting a whole, if short, chapter on the subject. His second chapter on measurements explains why exact measurements are so very important in medicine. There is a chapter on oxygen therapy, which of course is not usually found in physics texts. His last chapter is a very good one on atomic energy as used in medicine.

The book is in an attractive paperback edition very well illustrated with both photographs and drawings. The drawings are unusually clear. Each chapter is closed with

three to eight well chosen questions that should serve as an excellent review of the chapter. There are also simple lab experiments throughout the chapters. Some chapters have special references following the questions. There is a bibliography which is divided in a very interesting and useful manner. There is a section on nursing education, one on general texts and the remainder is divided as to the chapter headings.

The book is well and clearly written. The material is covered very well and Dr. Jensen has added a quality not usually found in text books. He uses a method of talking out the processes of the theories and formulae instead of just stating them and giving problems to prove them. He also uses exciting and unusual examples to demonstrate things so that one will be able to remember them better than if they were just stated.

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Modern Occupational Medicine. *Edited by A. J. Fleming, M.Sc., M.D., F.A.C.P., Medical Director and C. A. D'Alonzo, M.D., F.A.C.P., Assistant Medical Director, Medical Division. Associate Editor, J. A. Zapp, Ph.D., Director, Haskell Laboratory for Toxicology and Industrial Medicine, E. I. du Pont de Nemours & Company. Cloth, illus., 587 pp. Philadelphia: Lea & Febiger, 1960. $12.00*

This volume is a combination compendium and text on selected subjects in the field of industrial medicine and occupational medicine. It is arranged in eight major sections, under titles appropriate to the subject matter contained in each section. Section one, on organization of an industrial medical service, will be helpful and provocative for the worker in this field of medical practice. Sections four, five and six outline the author's philosophy and reasoning for including selected disciplines of medicine in this book and how the use of these disciplines such as psychiatry and toxicology are used to promote more efficient personnel in an industrial operation. Section seven, on acute poisoning, is a very useful and well written chapter which could be especially helpful if readily available to every practitioner of medicine and as a reference work in every emergency room.

The editors and contributors are especially qualified to produce such a book; it does, however, show the usual characteristics and defects of multiple authorship. The format and final product are pleasing and easy to read, the index is complete and useful. The reader with little or no training in occupational medicine, preventive medicine and public health will find this volume an excellent text on organizational, administrative and special problems; the specialist in these fields will find the book a fine review.

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Clinical Orthopaedics #18: Internal Derangement of the Knee Joint. *Anthony F. DePalma, M.D., Editor-in-Chief. With the assistance of the Associate Editors, the Board of Advisory Editors and the Board of Corresponding Editors. Cloth, illus., 293 pp. Philadelphia: J. B. Lippincott Company, 1960. $7.50*

This book, as others in the series, is divided into three sections, the first of which is devoted to internal derangement of the knee joint. All aspects of injuries to the knee and other knee diseases are covered by individual authors. The first of these is on surgical treatment of injuries to the knee by the eminent authority, Don H. O'Donoghue, M.D., and is exceptionally well written. It summarizes Dr. O'Donoghue's extensive clinical experience in repairing injuries to the knee. The postoperative care of such patients is described in detail and is most valuable. The second article in this section on arthrodesis of the knee by John Charnley, F.R.C.S., is excellent. It summarizes the author's previously published concepts of the values of compression arthrodesis. Other articles in the first section which are of exceptional interest are the discussion of chondromalacia of the patella by M. B. Devas, M.B., F.R.C.S., and reconsideration of lesions affecting the patellofemoral joint by the Editor, Anthony F. DePalma, M.D. A complete discussion of osteochondritis dissecans by Shigeo Nagura, M.D., should be of interest to anyone dealing with patients with knee injuries and their rehabilitation.

The second section dealing with general orthopaedics contains articles on anterior vertebral body fusions following lumbar disk excision by Paul H. Harmon, M.D., F.A.C.S., a study of 17-ketosteroids as related to senile osteoporosis by Marshall R. Urist, M.D., and Paul J. Vincent, M.D., a discussion of ununited intertrochanteric fractures of the femur by Robert Baker, M.D., as well as articles by other authorities on such varied subjects as the sinus tarsi syndrome and congenital dislocation of the radial head, failure to respond to plastic substances, bicipital tenosynovitis, all of which are of singular interest to the orthopaedic surgeon and those who deal with the treatment of musculoskeletal diseases.

The third section consists of two brief articles, the first by Guillermo Parra, M.D., of Mexico City, on stress fractures of the sesamoids of the foot and the second by Harold R. Horn, M.D., which consists of a description of the methods of securing reduction of a dislocated hip without anesthesia, and a review of the historical aspects of such reduction.

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Surgical Treatment of Trauma. *Edited by Preston A. Wade, A.B., M.D., F.A.C.S., Professor of Clinical Surgery, Cornell University Medical College; Attending Surgeon, New York Hospital; Consulting Surgeon, Hospital for Special Surgery, New York City; with 35 contributors. Cloth, illus., 779 pp. New York: Grune and Stratton, Inc., 1960. $26.50*

This volume presents a review of fifty-three lectures prepared by thirty-five surgeons of the Cornell University-New York Hospital Medical Center who are actually engaged in the treatment of trauma. The material has been published as a result of requests for written review of the lectures which were presented in a series of annual postgraduate courses on "Fracture and Other Trauma" given since 1956 at the Cornell University Medical College.

The purpose of the book is, like that of the lecture course, to give the practicing surgeon a practical review of the current methods used in the treatment of traumatic condi-

tions in order to improve the treatment given those individuals who are subject to the violence of modern living. There was no attempt toward standardization in the form of presentation. Each lecturer was allowed to present his material in a manner of his own choice. Some subjects are covered by more than one lecturer.

Material is organized under five main topics; Treatment—General Practice; Fractures—General Considerations; Head, Neck and Spine; Chest and Abdomen; and The Extremities.

Some of the chapters are rather general, such as Fundamental Principles of Wound Healing, Traumatic Shock, Care of Multiple Injuries, Treatment of Mass Casualties, Fractures in Children, and Peripheral Nerve Injuries. Other chapters such as Fractures of the Humerus, Fractures of the Mandible, Injuries of the Elbow, Fractures of the Forearm, and Fractures and Dislocations of Cervical Spine are more specific.

Coverage on topics varies considerably from two pages on amputations to thirty-eight pages on treatment of tibial shaft fractures. Illustrations are used by some. References are cited by only thirty-six of the authors, and a bibliography is given by only one.

Physical therapy treatment does not receive much coverage. Index listing includes: "Physiotherapy, after fractures . . . in spinal fractures; Rehabilitation after fractures." It is indeed unfortunate that one author's past experience has been such that he follows the advice of Watson-Jones and does not refer some of his fracture patients (namely elbow cases) to the "massage department," in the belief that "physiotherapy technicians should not be tempted to stretch elbows." It is also his belief that, "A good fracture surgeon is the best rehabilitation expert the patient can have. The surgeon who needs a specialist in rehabilitation to achieve a good result is not a good fracture surgeon." However, another lecturer, in discussing fractures of the dorsal and lumbar spine, states "when reduction and immobilization are indicated, exercise is still an essential part of the treatment . . . it would be a shame to forget the excellent results obtained during the last world war in rehabilitation centers."

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Booklets Received

Strike Back at Arthritis

U. S. Department of Health, Education and Welfare, in collaboration with the Arthritis and Rheumatism Foundation. Public Health Service Publication #747. Pages 44. Price 40¢.

This booklet, designed for physicians, graphically presents exercises that can be prescribed in the home-treatment of arthritic patients.

An Annotated Bibliography of Selected References in Cerebral Palsy for Professional Personnel and Parents

Compiled by L. Leon Reid, Ph.D. Stanwix House, Incorporated; Pittsburgh 4, Pennsylvania.

A ready reference to the literature on cerebral palsy is supplied by this annotated bibliography which will be helpful to all interested in this field.

Proceedings of National Nursing Home Institute

Conducted by the American Nursing Home Association in co-operation with the United States Public Health Service. Published by the American Home Nursing Association, 1346 Connecticut Avenue, N. W., Washington, D. C., 1961. Pages 109. Price $1.00.

Play Experiences Handicapped Mothers May Share With Young Children

Jessie S. Wall. Published by School of Home Economics, University of Connecticut, Storrs, Connecticut, 1961. Pages 22.

Handicapped mothers will welcome the wealth of play ideas incorporated into this bulletin.

Child Care Equipment for Physically Handicapped Mothers

Neva R. Waggner and Garland W. Reedy, School of Home Economics, University of Connecticut, Storrs, Connecticut, 1961. Pages 36.

This bulletin is one of a series based on a study of needs of orthopedically handicapped mothers to help them with their child care problems.

Dictionary of Abbreviations in Medicine and the Related Sciences

Edwin B. Steen, Ph.D. Professor of Anatomy and Physiology, Western Michigan University. F. A. Davis Co., 1960

This dictionary is the first book to attempt to bring order out of chaos in this field. The wide range of possible meanings for an abbreviation is well illustrated under the listing D: with eighteen well established meanings, -d, with ten; D- with three; and d-, with one. It is the authors hope that his work will contribute to the standardization of abbreviations. Physical Therapists will find this small volume helpful in clarifying abbreviations they may wish to use in their records or writing.

An Introduction to the Vocational Rehabilitation Process

Edited by John F. McGowan. G.R.P. Bulletin No. 3, Rehabilitation Service Series No. 555, November 1960. Office of Vocational Rehabilitation, U. S. Department of Health, Education, and Welfare. Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. Pages 201. Price $1.00.

A manual for the orientation of new vocational rehabilitation councilors and the in-service training of experienced personnel.

Selected Papers, Conference of Rehabilitation Centers and Facilities

828 Davis Street, Evanston, Illinois, 1960. Pages 20, Price $1.00.

A compilation of papers presented at the Conference's eighth annual workshop, December 4-8, 1959.

Physical Therapy Laughter

M. P. Gutierrez, 106 Marlin Street, Galveston, Texas.

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Hollis & Roper: Suspension Therapy in Rehabilitation – '58, 228 pp., 136 ill. (A revision of Guthrie-Smith's book) 6.00
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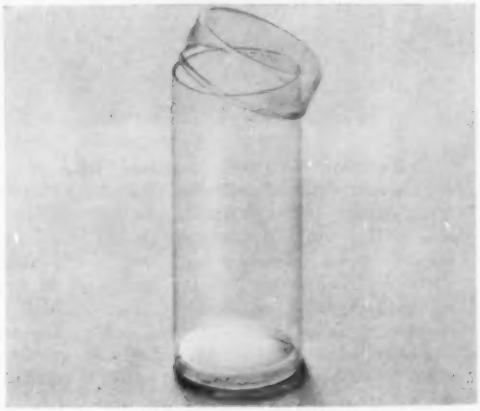
What's New

For more information on items write to The Physical Therapy Review, 1790 Broadway, New York 19, N. Y.

New items which may be of interest to physical therapists will be mentioned in these pages each month. The accompanying explanations are made by the manufacturers and have not been investigated by the *Physical Therapy Review*.

70. Plastic Vial



A one inch diameter, thin wall transparent plastic vial in any length desired, has a transparent or colored slip cap. Short lengths are usable for containers for small parts, pins, or supplies while larger lengths make convenient storage for instruments and pieces of equipment. Busse Plastics.

71. Preston Kit

This kit contains floor plans, layouts and equipment lists suitable for large, medium and small installations in hospitals, clinics or offices.

All equipment in the plans is drawn to scale so that individual units may be cut out and used as templates on institutional blueprints.

A desirable feature of the equipment lists is that they include not only major equipment but also the many smaller utility items that are often overlooked in estimates. List price figures are included on all items to provide a general guide for budget purposes.

Custom-tailored plans and lists to meet the individual requirements of new departments or additions to existing departments are available. Requests should be made on your letterhead. J. A. Preston Corporation.

72. Width Control Device

The "Narr-O-Matic" width control is a device that will narrow a wheel chair up to four inches to permit the wheel chair to pass through doorways and narrow passages.

No costly installation is required, as the "Narr-O-Matic" slips over the arm of the wheelchair and clips to the seat.

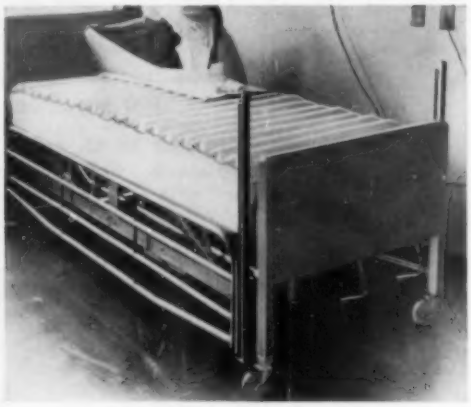
One "Narr-O-Matic" can be used on any number of wheel chairs and works on chairs with permanent or detachable arms. When not in use, it may be slipped off the chair.

The "Narr-O-Matic" will not change the chair in any way and may be operated by the wheelchair user or an attendant. Rehabilitation Equipment, Inc.

73. Message Book

Telephone Message Book enables the user to keep a permanent record of all in-coming phone calls. Sturdy, plastic spiral binder with imitation leatherette cover contains 400 perforated message blanks which tear out easily. Carbon copies of messages are recorded on unperforated full sheet duplicates which remain filed in binder. Four $7\frac{1}{4} \times 2\frac{11}{16}$" forms to page. Ample supply of carbon paper. Imprinting and numbering on request. Similar books are available for memos and receipts. Cromwell Printing, Inc.

74. Mattress Pad



Rest-on-Air aeropedic mattress pad, placed over a conventional mattress, provides a flexible layer of low pressure air suspension. Made of heavy duty vinyl it provides rubber sheet protection, quick cleaning and easy sterilization. Twenty air channels running crosswise in four separate sections of the pad are inflated by mouth or hand pump. These cross channels function in any position; eliminate pressure points; and provide ventilation under the body to reduce sweating, discomfort and skin irritation. Rest-on-Air weighs seven and a half pounds, fits the standard hospital bed and can be picked up and carried whether inflated or deflated. Howard Sales Co.

How to Borrow a Print of *The Return*

A complete listing of the film libraries where the Association's latest film is on deposit may be found on page 99 of the February, 1959, issue of the *Physical Therapy Review*. If the library nearest you cannot supply you on the date desired, contact another library near you. If you cannot obtain a copy, an order may be sent directly to the Motion Picture Service Bureau, 1697 Broadway, Suite 1406, New York 19, New York. The service fee is $2.75 and includes postage and insurance one way. The borrower is requested to pay return costs. The Bureau bills, and receives payment from the borrower. In addition to the 38-minute version, there is a TV version running 28 minutes, available from the Bureau at the same fee. There is also a 58-second television spot with sound track, excerpted from *The Return*, available on loan for a service fee of $1.00. *The Return* was chosen by Howard Thompson of *The New York Times* as one of the 10 best nontheatrical films of 1958.

Positions Available

Physical therapy practice acts have been enacted in 36 states. A listing of State Board Examinations appears in the advertising pages.

NEW ENGLAND

CHALLENGING POSITION—for mature qualified physical therapy consultant who is a qualified public health nurse. Responsibilities include a small case load, teaching and supervising staff nurses in appropriate rehabilitation measures and in general public health nursing. Liberal personnel policies. Salary open. Apply to Miss Anna C. Gring, Executive Director, Visiting Nurse Association of Bridgeport, 87 Washington Avenue, Bridgeport, Connecticut.

IMMEDIATE OPENING—Registered Physical Therapist for a general hospital of 207 beds. Paid vacation and sick leave, 40-hour week, 7 holidays. The Charlotte Hungerford Hospital, Torrington, Conn.

CONNECTICUT—Small community hospital in hills of north-central Connecticut needs aggressive registered therapist to plan and carry out program. Interested medical staff includes recognized expert in ultransonics. Housing available. Write Administrator, The Johnson Memorial Hospital, Stafford Springs, Connecticut.

PHYSICAL THERAPIST NEEDED—(Female) September opening, to work in an outpatient clinic, serving faculty, students, employees. At least two years of clinical experience required. New building, 40-hour week, 4-weeks vacation, excellent Blue Cross and Blue Shield Plan, Employees' Clinic and many other benefits. Salary commensurate with experience. Apply to Miss Judith W. Hill, Employment Supervisor, Personnel Office, Harvard University, 1352 Massachusetts Avenue, Cambridge, Massachsetts.

REHABILITATION and general medical hospital desires services of additional physical therapists. Near New Haven Hospital, close to Hartford and Waterbury. Fully equipped air-conditioned Physical Therapy Department. Thomas F. Hines, M.D., Associate Clinical Professor of Physical Medicine, Yale University & Director of Rehabilitation Services, Gaylord Hospital. Physical Therapist-in-Charge: Miss Charlotte E. Kinney, B.S., R.P.T. Salary open. Personal interview requested. Address: Chief Physical Therapist, Box 440, Wallingford, Conn.

WANTED—Two staff physical therapists for a rapidly expanding Rehabilitation Department of 200-bed Chronic Disease Hospital, both inpatients and outpatients. Salary commensurate with experience. Apply: Miss Ruth Oison, Superintendent, New Britain Memorial Hospital, New Britain, Connecticut.

POSITIONS AVAILABLE—For one registered supervisor and staff therapists. Opportunity for varied experience in rapidly expanding Physical Medicine and Rehabilitation Department in 160-bed general hospital. Excellent personnel policies. Salary open. Miriam Hospital, 164 Summit Ave., Providence, Rhode Island.

PHYSICAL THERAPISTS—(with or without experience) For large active P M & R department in a general hospital under direction of a certified physiatrist, Approved active residency training program. Teaching and inservice educational opportunities. Liberal salary, laundry and maintenance. Three weeks vacation. For information write Personnel Officer, State of Connecticut, Veterans Home and Hospital, Rocky Hill, Connecticut.

PHYSICAL THERAPIST—Woman, able to work independently wanted for Chronic Disease Hospital, New Haven County, Connecticut. Beginning salary $4,600 yearly with excellent fringe benefits. Fast advancement. Modern living facilities in new building with very small deductions for those who wish to live in. Reply to this Journal.

WANTED—Two staff physical therapists eligible for registration in Connecticut and members of the American Physical Therapy Association for 350-bed, fully accredited hospital located on beautiful Long Island Sound, one hour from New York City. Apply Personnel Department, Norwalk Hospital, Norwalk, Connecticut.

MIDDLE ATLANTIC

DIRECTOR OF PHYSICAL THERAPY—This is an outstanding opportunity for therapist who has already or is now ready for supervising a large new ideal department in a rehabilitation hospital treating children and adults. Salary is commensurate with experience and training. Further information and attractive brochure furnished on request. Apply to Mr. Neil T. LaForest, Sunnyview Orthopaedic and Rehabilitation Center, Inc., 1270 Belmont Avenue, Schenectady 8, New York.

SENIOR THERAPIST AND STAFF THERAPISTS—Modern City Hospital, 20 minutes from Times Square. Extensive teaching program headed by Dr. Lawrence I. Kaplan, Professor, N.Y.U. Full medical staff, research encouraged. Salary: $4,785 per annum with yearly increments to $5,716 for staff; $5,327 to and including $6,820 with annual increments of $240 for Senior. One month paid vacation, many liberal benefis. Contact Jerome R. Schattner, Chief Physical Therapist, City Hospital at Elmhurst, 79-01 Broadway, Elmhurst 73, New York. Telephone DEfender 5-3200, Extension 241.

PHYSICAL THERAPIST—$5,500, Children's Rehabilitation Service, Queens Hospital Center, Jamaica, L. I., New York JA 6-8600, Ext. 512.

STAFF THERAPIST—for a new and expanding department in a 350-bed, fully accredited hospital. Good salary and personnel policies, no weekends, teaching optional. Write: Personnel Director, St. Vincent Hospital, Erie, Pa.

QUALIFIED PHYSICAL THERAPIST—Recent graduate accepted. Non-sectarian residential center providing intensive treatment for 40 C.P. children. Salary open, good personnel policies. August vacation, Christmas holidays. Apply: Director, Home of the Merciful Saviour, 4400 Baltimore Avenue, Philadelphia 4, Pa.

STAFF PHYSICAL THERAPIST—For voluntary, community, multiple disability 35-bed rehabilitation center. Inpatients and outpatients. Liberal personnel policy. University town. Write Middlesex Rehabilitation and Polio Hospital, Georges Road and Route #1, North Brunswick, New Jersey.

PHYSICAL THERAPIST—Graduate from accredited college course in physical therapy. Some hospital experience preferred but not essential. Currently expanding. 439-bed hospital. Salary dependent upon experience. Liberal benefits, 37½-hour week, 25 miles from New York City and New Jersey shore resorts. Apply: Personnel Department, Muhlenberg Hospital, Plainfield, N. J.

WANTED—Registered physical therapist to work with a wide variety of chronic patients in a 500-bed hospital. Excellent opportunity in rehabilitation of patients with hyperkinetic disorders and basal ganglia surgery. Lovely grounds. Good opportunity for advancement. One month vacation after a year. Laundry and lunches provided. Salary open. St. Barnabas Hospital; 183rd Street & Third Avenue, Bronx, N. Y.; CY 5-2000.

WANTED—Physical Therapist for Physical Medicine and Rehabilitation Department of 670-bed general medical-surgical and teaching hospital. Thirty miles from Manhattan; near all Long Island recreational areas. Salary $5,100-$6,890, plus recent equivalent, 7½ per cent increase and some adjustment for experience, 35 hours per week. Full maintenance $32 per month, plus other benefits. Write: Dr. H. S. Whiting, Physiatrist, Director of PMR Department, Meadowbrook Hospital, Hempstead, New York.

WANTED—Male or female physical therapist for 100-bed hospital for chronic diseases. Recent graduate preferred. Good starting salary and personnel policies. Apply Physical Therapy Department, Muhlenberg Medical Center, Bethlehem, Pennsylvania.

PHYSICAL THERAPIST

Immediate opening in 340-bed general hospital located in upstate medical center. Female required. Experience not essential. Well established department, newly modernized. Liberal personnel policies, scheduled salary reviews. Contact Personnel Director, Syracuse Memorial Hospital, 736 Irving Avenue, Syracuse 10, New York.

QUALIFIED STAFF PHYSICAL THERAPIST—Female preferred, 600-bed hospital, 40-hour week. Social Security, sick leave and holiday benefits. Apply: Personnel Office, Lancaster General Hospital, 525 N. Duke Street, Lancaster, Pennsylvania.

STAFF PHYSICAL THERAPIST—In a general hospital accessible by train, subway, bus, or car. Please contact Sister M. Patricia Ann, O. P., at Mary Immaculate Hospital, 152-11 89th Avenue, Jamaica, N. Y., or call AX 1-3300.

STAFF THERAPISTS—N.Y.U. Medical Center affiliated hospital. Diversified experience offered: General Physical Therapy, Rehabilitation, and Respirator Sections. $4,680-5,580 with annual increments, Liberal vacation, sick leave policy. Write Department PM&R, Goldwater Memorial Hospital, Welfare Island, New York 17, N.Y.

STAFF THERAPISTS—For 523-bed general hospital in Manattan. Excellent salary range and benefits. Applicants must be eligible for licensure in N. Y. State. Write E. J. Megerian, Asst. Dir., Personnel, St. Luke's Hospital, 421 W. 113 St., New York, N. Y.

WANTED IMMEDIATELY—Two physical therapists for outpatient cerebral palsy clinic school. APTA, AMA approved graduate starting salary $4,500-$5,000 dependent upon experience. Liberal personnel policy. Contact William H. Brooks, Director, Essex Co. C.P. Center, 7 Sanford Avenue, Belleville, N.J., (PL 1-0200).

PHYSICAL THERAPIST—Licensed for 401-bed general teaching hospital and associated Cerebral Palsy Clinic. Position open in early fall. Convenient to all educational, cultural and recreational resources. Good salary, generous vacation and sick leave. Expanding department. Apply Personnel, Long Island College Hospital, 340 Henry Street, Brooklyn, N. Y.

PHYSICAL THERAPIST—FIELD SERVICE, to administer physical therapy treatments in the home or clinics. Suburban location convenient to N. Y. C. Liberal benefits, 35-hour week; car available for business use. Salary $4,790-$5,750. Bachelor's degree in physical therapy and eligibility for licensure in N. Y. State. Contact Miss Doris Krumlauf, Westchester Co. Dept. of Health, County Office Bldg., White Plains, N. Y.

SOUTH ATLANTIC

QUALIFIED PHYSICAL THERAPIST (two) for outpatient cerebral palsy treatment center. Starting salary $4550 per year. Two months vacation, liberal sick leave benefits. Liberal personnel policy. Contact Robert Schlitt, Director, Peninsula Cerebral Palsy Training Center, 901 24th Street, Newport News, Va.

WANTED IMMEDIATELY: Two (2) Staff Physical Therapists, expanding department of an orthopaedic clinic. Department under direction of a physiatrist. Vacation, sick leave, holidays. Inquire: Arthur E. White, M.D., Anderson Clinic, South 25th Street & Army-Navy Drive, Arlington, Va.

WANTED—Physical therapist, registered, for private clinic, new, modern; 22 physicians. Specialties, including 4 general surgeons and 2 orthopedic surgeons. Salary dependent upon experience and training. Usual employee benefits. Apply A. T. Early, Clinic Manager, The Nalle Clinic, 1350 South Kings Drive, Charlotte 7, North Carolina.

OPPORTUNITY FOR A STAFF PHYSICAL THERAPIST—in a 600-bed Eastern Medical Center. Will function under the supervision of a physiatrist and receive comprehensive experience involving a wide variety of cases. Medical Center located in close proximity to mountains, coast, and large cities. Contact Personnel Office, University of Virginia, 1416 West Main Street, Charlottesville, Va.

ASSISTANT CHIEF PHYSICAL THERAPIST—for well equipped department in a 500-bed modern general hospital. Forty hour week; paid vacation; paid sick leave; Salary open. Hospital is Regional Medical Center. Apply: Personnel Director, The Macon Hospital, Macon, Ga.

PHYSICAL THERAPIST—New 300-bed Atlanta hospital needs additional therapist: 40 hour week, paid vacation, laundry of uniforms, sick leave, hospitalization and group life insurance. Please write giving full information on background, experience, salary desired, to Chris. J. McLoughlin, M.D., 1010 Medical Arts Building, Atlanta 8, Ga.

STAFF THERAPISTS: For large Physical Medicine Department in 1,200-bed general hospital with three medical schools affiliated. Salary $4,345-$5,355 depending on experience. Policy of rotation through various sections of department, including 29 bed rehabilitation ward. D. C. Civil Service appointment and benefits, 40-hour week, physiatrist in charge. Apply to: Dr. Josephine J. Buchanan, Chief, Dept. of Physical Medicine, D. C. General Hospital, Washington 3, D. C.

REGISTERED STAFF PHYSICAL THERAPISTS—1,400-bed hospital with well equipped department under direction of a physiatrist. Paid vacation, 40 hour week, and sick leave. Starting salary $4,128 with annual increases. Contact Director, Physical Medicine Department, Medical College of Virginia, Richmond, Virginia.

REGISTERED PHYSICAL THERAPIST—Female, for well equipped department in expanding private clinic of four orthopedic surgeons. Excellent personnel policies and benefits, paid vacations, group health and life insurance furnished. Salary dependent on training and experience. Apply: Mr. James B. Hearn, Business Manager, Atlanta Orthopedic Clinic, 545 Baptist Professional Building, Atlanta, 12, Georgia.

PHYSICAL THERAPIST—For duties in State Crippled Children's Services. Merit system, retirement benefits, liberal vacation and sick leave. Salary: Physical Therapist I without experience, $4,680; Physical Therapist II with experience, $5,220-$5,940. Please enclose a recent photograph. Write to: Director, Crippled Children's Services, State Board of Health, Dover, Delaware.

SENIOR PHYSICAL THERAPIST—Responsible position at Maryland State hospital in pleasant suburban community of Baltimore. $5,040-6,302 (Maximum in 6 years). Requires graduation from AMA or APTA school of physical therapy and 2 years experience including 6 months in rehabilitation of chronically ill and disabled. For details, write Commissioner of Personnel, 301 W. Preston Street, Baltimore 1, Maryland.

PHYSICAL THERAPIST—For work involving the care of crippled children. Excellent starting salary with increase in 6 months. State registration by reciprocation for ARPT and APTA. For further information write Newton C. McCollough, M.D., 1141 Delaney Street, Orlando, Florida.

REGISTERED PHYSICAL THERAPIST—Male, for 350 bed, short-term general hospital. Recent graduate accepted. Salary open. Liberal personnel policies. Apply Personnel Office, Memorial Hospital, 1901 Arlington Street, Sarasota, Florida.

PHYSICAL THERAPIST—One immediately, another January 1962 in air-conditioned cerebral palsy school. Five-day week, public school holidays, 1 month summer vacation, sick leave. Salary open. Contact Mrs. A. M. Inman, Executive Director, Greensboro Cerebral Palsy School, 1601 Gatewood Ave., Greensboro, N. C.

TIRED OF SNOW? Opening September 1, 1961 for Physical Therapist in a general outpatient community treatment program including physical therapy, occupational therapy and speech therapy. Affiliated with the National Society for Crippled Children and Adults, Inc. Five day week, liberal vacation and sick leave, Blue Cross Hospitalization Plan, social security. Salary open. Apply: Mrs. David L. Black, Volunteer Director, Junior Service League Orthopedic Center, 1219 Dunn Avenue, Daytona Beach, Florida.

THREE STAFF PHYSICAL THERAPISTS—for progressive program in 450-bed modern general hospital located in large leading Federal mental hospital which is nationally recognized teaching center. Applicants must meet standards established by AMA at time of graduation or APTA if graduated prior to 1936. One year professional experience required for starting salary of $5,355. Positions in career Civil Service. Liberal vacation and sick leave, life and health insurance and retirement benefits. Hospital situated on beautiful reservation near U.S. Capitol. Opportunity for advanced education at nearby universities. Write Personnel Office, Saint Elizabeths Hospital, Washington 20, D.C.

EAST NORTH CENTRAL

PHYSICAL THERAPIST—for a four year old C. P. Center; starting salary $5000-$5500, up, plus increments, depending on training and experience. Prefer special training and/or experience in C.P.; if not C.P. trained or experienced, opportunity available for advanced training in C. P. with pay. Apply Mrs. S. L. Zieve, Coordinator, Cerebral Palsy Center, P.O. Box 294, Elyria, Ohio.

REGISTERED PHYSICAL THERAPIST

Opportunity to work with two other therapists in a new 263-bed hospital in a pleasant city of 100,000 population located an hour and half drive west of Chicago. Liberal personnel benefits; 40-hour week. Excellent starting salary. Four-room furnished apartment available at cost. Write Personnel Director, Rockford Memorial Hospital, Rockford, Illinois.

WANTED: STAFF PHYSICAL THERAPIST—Female, graduation from approved school required. General hospital, 471-beds. Major expansion program in progress with new equipment and quarters completed for Physical Therapy Department. Salary range $4,200 to $4,800. Forty hour work week plus liberal fringe benefits. Apply Personnel Director, Butterworth Hospital, Grand Rapids 3, Michigan.

STAFF PHYSICAL THERAPIST: Position available. Salary range $4525-$4975. Starting salary based on experience. Merit increases. 37½-hour week, vacations, holidays, sick leave. Well-equipped department. Affiliated with Northwestern University Medical School. P.T. student training program. Comprehensive rehabilitation program for in-patients and out-patients. 70-bed hospital. Congenial atmosphere. Excellent opportunity for personal development. Should be graduate of approved school of P.T. and hold membership in APTA or Registry. Contact Miss Hildegard Myers, RPT, Rehabilitation Institute of Chicago, 401 E. Ohio St., Chicago 11, Ill.

PHYSICAL THERAPIST for general hospital work. Completely new facilities, four therapists, University affiliation. Complete program of benefits including three weeks vacation to start. New 100-bed rehabilitation-oriented facility being developed for chronically ill. Write: Mark Slen, Assistant Administrator, Parkview Memorial Hospital, Fort Wayne, Ind.

PHYSICAL THERAPIST—For modern general 250-bed hospital ideally located on Chicago's north shore near parks and beaches. Excellent working conditions in newly expanded physical therapy department offering separate facilities for inpatients and outpatients. Starting salary for recent graduate $440 per month plus regular increases in 6 months and annually thereafter. Liberal employee benefit program includes free Blue Cross, free life insurance, and a retirement program. For more information contact Personnel Director, Louis A. Weiss Memorial Hospital, 4646 North Marine Drive, Chicago 40, Ill.

CONSULTING PHYSICAL THERAPIST—For statewide program for physically handicapped children. Minimum of 2 years experience under supervision required. Work consists primarily of counseling and teaching rehabilitative care in the home. Per diem and mileage are paid when working out of office. Salary: $450-525 a month. Headquarters are in new modern building. Have Social Security, Public Employees and Retirement Plan and group hospital and medical care insurance. Apply: F. M. Hall, M.D., Director, Services for Crippled Children, State Department of Public Welfare, Room 701, 100 N. Senate Avenue, Indianapolis 4, Indiana.

PHYSICAL THERAPIST—Registered or qualified, for two staff positions. Excellent opportunity in new modern department; attractive pay and fringe benefits. Apply Personnel Department, Mt. Carmel Mercy Hospital, 6071 West Outer Drive, Detroit 35, Michigan.

EXPERIENCED PHYSICAL THERAPIST—To carry small case load and give consultant services to nursing staff. Salary range $5,500-$7,500. Beginning salary dependent on qualifications. Contact Visiting Nurse Association, 1226 N. Astor St., Milwaukee 2, Wisconsin.

IMMEDIATE OPENINGS—for Physical Therapist at supervisory levels. Salary open with merit increases. 3 week vacation, 2 week sick leave, 6 holidays. Clinics supervised by two Board physiatrists. Contact Judith Nelson, RPT, Coordinator of Services, 300 E. War Memorial Drive, Peoria, Illinois.

STAFF PHYSICAL THERAPIST—For ultramodern department in 325-bed teaching hospital. Chicago lakefront location on Northwestern University campus. Five-day week, 3-week vacation, 18 days sick leave, regular salary increases. Hospital-owned apartment hotel nearby. Write: Glenn W. Richardson, Personnel Relations Manager, Box 200, Passavant Hospital, 303 E. Superior, Chicago 11, Illinois.

STAFF POSITION FOR REGISTERED THERAPIST—Busy department in 850-bed general hospital. Variety of cases. Many employee benefits including 3-week vacation, free laundry, free Blue Cross after one year. Living accommodations available. Contact John B. King, Director of Personnel, Presbyterian-St. Luke's Hospital, 1753 West Congress Street, Chicago, Illinois.

REGISTERED PHYSICAL THERAPIST—For a generalized public health nursing agency caring for the sick in their home on a visit basis. Must have a car. Travel reimbursement. Good working practices. Bay County Department of Health, Bay City, Michigan.

REGISTERED PHYSICAL THERAPIST—For Pre-School Orthopedic Room in public school located in Saginaw, Michigan. Will be working with 15 children, ages 3 through 8 for 10 months per year. Starting salary $4,700 up to $7,693 with 10 days paid sick leave and paid holidays. Apply M. G. Millet, Rt. #1, Burt, Mich.

STAFF PHYSICAL THERAPISTS—Salary range $4,800-$5,600. Starting salary based on experience. Merit increases, 40-hour week, 3-weeks vacation, holidays, sick leave, health and life insurance and retirements plans available. Affiliated with Wayne State University Medical School and developing P.T. School. Comprehensive rehabilitation program for inpatients and outpatients and P.T. for 650-bed general hospital. Graduates of approved schools of P.T. and should hold membership in APTA and/or Registry. Contact Mr. John C. Bay, Associate Director, Rehabilitation Institute, Inc. 261 Brady, Detroit 1, Michigan.

PHYSICAL THERAPIST—New position. Conduct Community Homebound Therapy Program in conjunction with the Visiting Nurse Association. Program is part of physical therapy services of established comprehensive Rehabilitation Center. Work as staff member and under supervision of Medical Director (Physiatrist) of the Rehabilitation Center. Excellent personnel policies. Starting salary: $5,100 to $5,300. Apply: Robert A. Silvanik, Administrator, Rehabilitation Center, 326 Locust Street, Akron 2, Ohio.

WANTED—Trained and experienced physical therapist to assist in the physical therapy department of a 300-bed hospital. Salary open, depending on experience. Liberal personnel policies. Address: Hospital Administrator, St. Anthony Hospital, Terre Haute, Indiana.

PHYSICAL THERAPY POSITIONS available in Institute Departments located in three Peoria hospitals. Excellent education opportunities, both clinical and didactic. Three weeks vacation per year, sick leave, insurance benefits, 6½ holidays per year. Complete physical medicine and rehabilitation program under supervision of physiatrist. Progressive salary scale commensurate with experience and meritorious service. Apply Medical Director, Institute of Physical Medicine and Rehabilitation, 619 N.E. Glen Oak Avenue, Peoria, Ill.

EAST SOUTH CENTRAL

PHYSICAL THERAPIST—for department in 65-bed JCAH Hospital located on college campus, department established in Jan. 1960, all new equipment—very compiete. Contact Administrator, Berea College Hospital, Berea, Kentucky.

WANTED—Physical therapist, good opportunity for recent graduate, no experience needed, male or female, for Rehabilitation Center, Inc., which provides full rehabilitation services for inpatients and outpatients. Desirable working conditions and salary ($4,200 for first year). Address applications to Administrator, Rehabilitation Center, Inc., 340 East Madison Street, Louisville 2, Kentucky.

REGISTERED PHYSICAL THERAPIST—For 150-bed general hospital in the greater Cincinnati area. Salary open. Apply to Personnel Department, Wm. Booth Memorial Hospital, Covington, Kentucky.

WEST NORTH CENTRAL

IMMEDIATE OPENING—For staff physical therapist in outpatient rehabilitation center, an Easter Seal Affiliate. Near summer lake resorts and newly established ski resort in the Minnesota Arrowhead Country. Good starting salary with regular increments. Forty hour week, 6 paid holidays, social security, sick leave, 2 weeks vacation with pay after first year of employment with 3 weeks thereafter. Blue Cross-Blue Shield coverage paid for by Center. Give complete detailed training and experience and send recent photograph when applying. Apply to R. J. Rabideau, R.P.T., Director, Iron Range Rehabilitation Center, Virginia, Minnesota.

WEST SOUTH CENTRAL

FULL TIME REGISTERED PHYSICAL THERAPIST—eventually to head department for 180-bed private general hospital, located on top of a modern medical professional building. Salary dependent on experience. Paid vacation, sick leave and other benefits. Ideal working and living conditions in beautiful San Antonio. Apply J. F. Morrison, Administrator, Nix Memorial Hospital, San Antonio, Texas.

OPENING FOR EXPERIENCED REGISTERED PHYSICAL THERAPIST—(Female, Sept. 15th) In private Orthopedic Clinic. Salary $450 per month plus yearly bonus, 35-hour week. Two weeks paid vacation. Contact Graybill-Wilson Orthopedic Clinic, 1202 Arlington, Lawton, Okla.

WANTED IMMEDIATELY—Physical Therapist, staff position in crippled children's hospital in resort city on Texas Gulf Coast treating primarily cerebral palsy and polio with a few adult patients. Starting salary is $425; 37½ hour working week, 6 paid holidays, 12 day annual sick leave paid. 2 week vacation with pay after one year, noon meal and laundering of uniforms gratis. Contact Administrator, Ada Wilson Hospital of Physical Medicine and Rehabilitation, 1316 Third Street, Corpus Christi, Texas.

MOUNTAIN STATES

STAFF PHYSICAL THERAPIST—Eventually to head department for expanding 325-bed hospital in sunny Tucson. Liberal personnel policies, 5-day week, salary dependent on experience. Apply: Margaret M. Reed, R.P.T., Physical Therapy Dept., Tucson Medical Center, Beverly and Grant, Tucson, Arizona.

PHYSICAL THERAPIST—Interested in comprehensive rehabilitation program. Pleasant working conditions in well equipped rehabilitation center. Salary commensurate with ability. Send resume to: Director, Rehabilitation Center, St. Mark's Hospital, Salt Lake City 16, Utah.

PACIFIC

SAN DIEGO COUNTY
CRIPPLED CHILDREN'S SERVICES

Graduates—Approved schools for Physical Therapy. Positions open in special schools for handicapped children. Starting salary $507; liberal employee benefits. Temporary appointment pending California registration. Write Dept. Civil Service and Personnel, Rm. 403, Civic Center, San Diego, Calif.

REGISTERED PHYSICAL THERAPIST—(man or woman) for 115-bed general hospital. Immediate opening; 5-day week, paid vacation, sick leave, 6 paid holidays. Salary dependent on experience. Must be eligible for California registration. Located resort coast village overlooking Pacific Ocean. Apply Personnel Manager, Scripps Memorial Hospital, LaJolla, California.

PHYSICAL THERAPIST I

Opening in large general hospital; $413-499 per month (recommended salary: $454-550); good personnel policies; retirement and O.A.S.I.; holidays; vacation and sick leave benefits; must be registered or eligible. Apply San Joaquin County Personnel Director, Room 530, Courthouse, Stockton 3, California.

IMMEDIATE OPENINGS—For two staff therapists qualified to take California registration. Newly expanded department, under the direction of orthopaedist, in 180-bed general hospital with 30-bed convalescent unit and excessive outpatient traffic. Salary based on experience; 40-hour, 5-day week; paid vacation after one year; 6 paid holidays. Paid Blue Cross after 6 months. Apply to Miss Joan Egeris, chief therapist, St. John's Hospital, 333 No. F Street, Oxnard, Calif.

REGISTERED JUNIOR OR STAFF PHYSICAL THERAPIST—For orthopedic department of Kaiser Foundation Hospital. Salary open, generous benefits. Apply to Mrs. Irene Holze, Kaiser Foundation Hospital, 14th and Cutting Blvd., Richmond, California.

PHYSICAL THERAPIST—Registered, for multi-specialist clinic of 23 physicians with wide range of cases. Newly air-conditioned department, many fringe benefits, excellent opportunity for advancement. San Jose Medical Clinic, 45 South 17th Street, San Jose, Calif.

PHYSICAL THERAPIST—For direct service to home-bound patients and consultation for nursing staff. One other therapist in similar capacity. Nursing staff of 65. Salary range $5,400-$6,756; 40-hour, 5-day week; 7 holidays; 15 days vacation increasing to 21 days in 3 years; 12 days sick leave; 8 cents business mileage. Write Cynthia A. Dauch, Executive Director, Visiting Nurse Association, 2530 West 8th Street, Los Angeles 57, California.

PHYSICAL THERAPISTS—Registered or eligible for registration in California. Staff and supervisory openings in expanding rehabilitation center. Non-contributory retirement plan and excellent hospitalization insurance program. Contact Personnel Director, Cedars of Lebanon Hospital, 4833 Fountain Avenue, Hollywood 29, Calif.

IMMEDIATE OPENING—Qualified physical therapist for 16-doctor clinic on the West Coast. Small department with good equipment. 40-hour week. Vacation and sick leave and other benefits. Minimum starting salary $4,800. Apply W. A. Drummond, Santa Barbara Medical Clinic, Santa Barbara, California.

IMMEDIATE STAFF OPENING—Qualified female physical therapist, 5-day 40-hour week. Holidays and sick leave. Experienced. Beginning salary: $500 per month. Pleasant working conditions. Contact Evelyn M. Hallas, Chief Physical Therapist, Ventura Physical Therapy, 151 No. Brent, Ventura, Calif.

CHIEF PHYSICAL THERAPIST—For 450-bed general hospital. Salary $425, two years minimum experience 40 hour, excellent employee perquisites. Close to mountains and ocean. Contact Employment Recruiter, Good Samaritan Hospital, Portland 10, Oregon.

CEREBRAL PALSY THERAPIST (PHYSICAL)—$458-$556 monthly requires completion physical therapy curriculum, one year's experience, and California State registration or eligibility. Career civil service benefits available. Apply to Alameda County Civil Service, 188 Twelfth Street, Oakland 7, California.

GRADUATES OF APPROVED SCHOOLS FOR PHYSICAL THERAPISTS: You may now practice under professional supervision in this State pending registration with the California Board of Medical Examiners. Positions open in State Hospitals, the Veterans Home, and special schools for handicapped children. Starting salary $458, higher in some locations; liberal employee benefits; promotional opportunities. Streamlined civil service examinations twice a month in San Francisco and Los Angeles, and on request in other states near candidate's residence. Write: State Personnel Board, 801 Capitol Avenue, PT 71, Sacramento 14, Calif.

FOREIGN—SCOTLAND

PHYSICAL THERAPISTS—Needed in Scotland at Perth Royal Infirmary and Bridge of Earn Hospital. Applicants should send details of education, training, qualifications, experience, and names of two references, to the Group Medical Superintendent, Perth Royal Infirmary, Perth, Scotland.

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The greatest advance in mat construction in many years.

The new "miracle material" used in Densifoam gym mats features outstanding ability to absorb shock, not available heretofore. Developed by the United States Rubber Company, it absorbs up to 10 times more impact than any other material manufactured, yet it provides the degree of firmness desired in gym mats. Densifoam mats of 1" thickness are superior in shock absorbence to 4" conventional mats; therefore only 1" thickness is needed for comfort and maximum protection, eliminating the need for more bulky mats. Other advantages are:

LIGHT WEIGHT: Densifoam Gym Mats are much lighter and less bulky than other mats: weight only 10 ounces per square foot — therefore it's easy to handle even very large mats.

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